SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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Original Correspondence.

THE LOAN COLLECTION OF SCIENTIFIC APPARATUS.

GEOLOGY AND MINING.

It was originally intended to open this exhibition to the public in June, 1875, but this being found utterly impracticable the date of the opening was postponed to March of the present year; and as that time drew near it became necessary, owing to the large number of objects sent from abroad, and the late period of their arrival, to adopt a further postponement to the month of May, when, as our readers are probably aware, this magnificent collection became available to the sightseer and the student. The authorities have wisely adopted a clear and definite principle in arranging the objects entrusted to them, and there is, consequently, no difficulty experienced in reaching any particular department of science. When we mention that the first edition of the catalogue comprises 4576 articles, or collections of articles, distributed over 21 sections, it will be sufficiently obvious that the task of classification and arrangement was no easy one, and the result is highly creditable to those who directed it. Though we have examined the whole collection with very great interest and satisfaction, it would be foreign to the object of this Journal to do more than direct attention to section 16 —geology and mining—which is placed in one of the upper rooms at the north-west end of the exhibition, and to which access will be most readily obtained by the entrance in Prince Albert's-road.

The general scope of this section will be best understood from a brief statement of the objects and articles classified in it—instruments for field and underground surveying; typical collections of rock specimens, including veinstones; typical fossils arranged stratigraphically; maps in different stages, and finished maps; geological models, horizontal and vertical sections; diagrams and plates of fossils, and general geological diagrams used in lecture-rooms; microscopic sections of rocks and minerals, and apparatus for cutting such sections; anemometers, water-gauges, mining barometers, and thermometers; mining plans, sections, and models of workings.

Taking the official catalogue as our guide, we will briefly allude to some of the more noteworthy objects in the two divisions of this section of the collection. The Geological Society of London exhibits the apparatus, &c., employed by Sir James Hall, Bart., in his celebrated experiments between 1787 and 1805; maps and table illustrating William Smith's first efforts towards producing the Geological Map of England; and maps illustrating the rise and development of the art of geological surveying in the British Isles and the colonies. Among the last-named are included William Smith's first large Geological Map of England, published in 1815; G. B. Greenough's Geological Map of England, the first edition, published in 1819; Bain's first and smaller Geological Maps of South Africa; the first edition of John Phillips's Geological Map of Yorkshire; and Farey's section across the Weald. The director of the Geological Survey of Scotland (Prof. Geikie) contributes a map showing its work, some of the sheets being in MS. Mr. R. W. Mylne, C.E., F.R.S., F.G.S., exhibits seven maps and diagrams relating to London and its environs; Mr. J. Clifton Ward a Geological Map of the Keswick district; the Society for Promoting Christian Knowledge Prof. Phillips' Geological Map of the British Isles; Mr. C. E. de Rance a Geological Map of the Arctic Regions; and Mr. Joseph P. O'Reilly (Royal College of Science, Dublin) maps illustrating theories of relative directions of lodes, joints, mountain chains, coast lines, limits of geological formations and rivers. The Geological Maps and Model of New Zealand, numbered 3268, are for many reasons exceedingly interesting. These maps, which are exhibited by Dr. J. Hector, C.M.G., comprise—1. Copy of the first Geological Map of the whole of New Zealand, prepared by Dr. Hector in 1865, and engraved in 1869.—2. Geological Sketch Map of New Zealand; and, 3. A relief model of New Zealand on the same scale as the last-named map, and with a vertical scale four times as great as that of the horizontal. Messrs. Willett and Topley contribute, on behalf of the Sub-Wealden Exploration Committee, illustratiuns of the Sub-Wealden boring at Netherfield, near Battle, Sussex, of which many inreresting details, too long for quotation, are supplied in the catalogue. The Oxford University Museum exhibits 15 original sketches (3291), illustrative of geological scenery and sections taken by Dr. Buckland between 1815 and 1840. Mr. H. C. Sorby supplies eight contributions, among which are microscopical photographs of sections of iron and steel, and a working model illustrating the movement of waves in forming ripples. Mr. J. Starkie Gardner sends a very interesting series of leaf remains from the Lower Bagshot beds (Middle Eocene), collected on the coast between Poole Harbour and Bournemouth. Professor Dr. Orth, of Berlin, exhibits a geognostical and agricultural map of the Manor of Friedrichsfeld, near Berlin, an example of a new cartographic method; and the Royal Mining Directory, Saarbrück, a plan of the Royal Heinitz-Dechen Coal Mine, consisting of—1. Plan of the whole mine, in six plates. —2. 25 special ground plans; and, 3. A profile plan in 10 plates. No. 3378 is a collection of 200 samples of different lodes and specimens of ores from the mines of the mining district of Bonn. The ores are arranged systematically, according to mineralogical system, and with their names, localities, peculiarities of the mines, and places of working; also showing the distribution and position of the lodes, and the quality of the ores. The foregoing are but a few examples of the contents of the geological portion of the section, which is enriched by many contributions from the Continent, especially from Germany.

Turning to the mining division, we find that the exhibits are not nearly so numerous, but some of them will at once arrest the visitor's attention. The specimens shown are divided into two classes—mining instruments and mining models and plans. In the former we have—first, anemometers, of which Francis Pastorelli exhibits Biram's, improved for coal mines, and Mr. R. M. Lowne his own patent ventilation anemometer, originally introduced by Stanley. Mr. D. F. Morison, of Newcastle-on-Tyne, sends Ramsay's water-gauge for measuring the friction of ventilating currents in mines or other places. Next come air meters, of which Elliott Brothers show a mining barometer and thermometer, and Francis Pastorelli an air meter, used for the ventilation of mines and large buildings, and a patent electric velocimeter for ascertaining the velocity of air currents in any part of the workings of a coal mine at a distance of two or more miles from it in a chosen station above ground. Mr. Lowne exhibits his own patent colliery air meter, constructed especially for use in mines. Among theodolites, compasses, lamps, &c., there are exhibited the following:—Mining compass, with independent vernier readings (P. Adie); W. König's telescope mine compass, with level and graduated arc, together with Hörold's centre foot-plate, in box with lock (Royal Prussian Upper Mining Court for the provinces of Silesia, Posen, &c.); Junge's Mine Levelling Lath (Royal Saxon Mining Academy, Freiberg); collection of various mine signals for subterranean measuring of angles with the theodolite (the same); six-inch theodolite, with two telescopes, by Messrs. Troughton and Simms, with adaptation for underground surveying, suggested by the contributor (Walter Rowley, C.E., F.G.S.); and two maps, with photographs of mine surveying instruments (C. Osterland, Freiberg, Saxony). The North of England Institute of Mining and Mechanical Engineers contribute a case of Davy lamps of various designs, model of engine-beam, &c. The catalogue furnishes an elaborate table of these 45 lamps, giving their names, descriptions, where they are used, approximate date of manufacture, and the velocity of explosive current requisite to render the lamp unsafe in feet per second. No. 3411 is Bidder's patent magnetic lock for miners' safety-lamps. Among mining models and plans, Mr. Jos. P. O'Reilly, Royal College of Science, Dublin, exhibits a working model of a proposed new system of hand drill for mining purposes, of which he supplies a detailed description. Mr. W. Rowley sends two plans illustrating the principal modes of working coal in the Yorkshire mining district, in order to show the advantages for economy of working and ventilation of the "long wall" system, and the disadvantages resulting from the "pillar and stall" mode of working; and he also contributes general vertical sections showing the order of the various seams of coal in the Yorkshire coal field.

In concluding these brief notes it will not be out of place to recommend to intending visitors the Handbook of the Collection, prepared at the request of the Committee of Council on Education, and published by Messrs. Chapman and Hall, of Piccadilly, in which the paper on Geology is by Prof. Archibald Geikie, F.R.S., while that on Scientific Apparatus Applied in Mining bears the signature of Mr. W. Warington Smyth, M.A., F.R.S.

SCIENCE AT SOUTH KENSINGTON.

The last of the Conferences was held on Friday, Mr. JOHN EVANS, F.R.S., President of the Section for Physical Geography, Mining, and Geology, in the chair.

Prof. RAMSAY, F.R.S., Director-General of the Geological Survey of the United Kingdom, gave an interesting account of the origin and progress of that survey from the time of its commencement by Sir Henry de la Beche, in 1832, down to the present day. The task was undertaken by Sir Henry at his own wish, and at first almost entirely at his own expense, the Government grant being limited to 300*l.* a year. Commencing with the metalliferous districts of Devon and Cornwall, as the most likely to attract attention from a money point of view, the survey was next carried on in the South of Wales, thence to the north of that Principality, and afterwards to the northern counties of England. In Wales Sir Henry de la Beche found valuable work being done by Sir William Logan, who afterwards became director for the important geological survey of Canada. Prof. Ramsay's own connection with the Survey dated from 1841, when he was one of four assistants to the director. Dr. Edward Forbes' appointment as palæontologist dated from about the same time. In 1845 the Geological Survey was transferred from being a branch of the Ordnance Survey to Her Majesty's Office of Woods and Forests, and that of Ireland, which had been commenced in 1834 by Major Portlock, was amalgamated with it, the director for Ireland being Captain (now General) Sir Henry James, and Prof. Ramsay himself being director for the United Kingdom. The staff was also increased by some able men, among whom might be mentioned Prof. Warington Smyth, Mr. Robert Hunt, Keeper of the Mining Records, and Mr. Playfair. Systematic memoirs on various districts now appeared, and the maps were produced on a scale of 6 in. to the mile, instead of 1 in., as formerly, so commencing the well-known and beautiful series of maps which were published by Her Majesty's Stationery Office for the information and use of the public. In 1851 the Museum of Practical Geology, in Jermyn-street, was opened by the Prince Consort. The nucleus of this museum had been formed at Craig's-court, near Charing cross, in 1837. The Royal School of Mines, with its staff of professors, was now started, and in 1853 the Survey and this school were placed under the Department of Science and Art. In 1855 Sir Henry de la Beche died, and was succeeded by the late Sir Roderick Murchison, whose place the speaker (Prof. Ramsay) now filled. In 1856 the survey of Scotland was commenced, the directors for England, Scotland, and Ireland respectively being Profs. Bristow, Geikie, and Hull, under the general direction of himself. He might be forgiven for mentioning that the members of the Royal Commission on the coal supply of the country had stated that their work had gained both in efficiency and time from the fact that such complete and trustworthy geological maps were found ready at hand. Prof. Ramsay concluded by enumerating some of the important surveys which had sprung from that of England, such as that of Canada, already referred to which was being extended by Mr. Selwyn to the whole British territory in North America; of Queensland, under Mr. Daintree; British Guiana, under Mr. Brown; and of New Zealand, under Dr. Hector.

M. DAUBREE, director of the School of Mines, Paris, expressed the high appreciation with which the British Survey was regarded on the Continent; and was followed to the same effect by M. Renard, of Belgium, who, however, put some questions as to the hypothetical character of some of the indications on the older maps both of this and of his own country.

Mr. W. TOPLEY read a paper on the Sub-Wealden Boring, and was followed by Major BEAUMONT, M.P., who lamented that such an important and interesting work should now be suspended for want of funds. The depth reached was 1903 ft., and this could be rapidly increased, and the question at issue settled if the Black Diamond Boring Company, with which he was connected, were enabled to continue the work. They had promises of 150*l.*, and a conditional promise of 950*l.* from Mr. Willett and other gentlemen, if the remainder of the sum—1500*l.*—required to push the boring to the depth of another 500 ft. was forthcoming. Major Beaumont cited instances of the rapid work performed by the machines of the company at Ham, in Westphalia, and at Rhinefelden, near Berne. At the latter place a hole of 3 in. diameter had been sunk to a depth of 1400 ft. in two months.——The CHAIRMAN called attention to the cores from the Sub-Wealden boring, which could be seen in an adjoining gallery.

Mr. C. E. DE RANCE, F.G.S., read a paper on the Geology of the known Arctic Regions.

Mr. W. GALLOWAY followed with a paper on Colliery Explosions. The prevention of these should, in his opinion, be looked for rather in the careful observance of well-known and common-sense precautions as to ventilation and so forth, and the consequent dispersion, whenever possible, of the noxious gases, than to refined scientific appliances for protection against them when unnecessarily allowed to accumulate.

A paper was then read by Mr. W. S. MITCHELL, M.A., &c., on the MS. Tables and Maps of William Smith, exhibited by the Geological Society of London. They consisted of the first table of strata of England, dated 1799; the first geological map ever made, that of the district around Bath, dated 1801; and the first geological map of England of the same period. The history of the steps by which William Smith was led to make his discovery was traced, and stress was laid on the fact that Smith's work preceded by some time that of Cuvier and that of Werner, and that the first discovery of the sequence of strata was due to an Englishman.

Prof. Baron VON ETTINGSHAUSEN then read in German a paper on the Tertiary Origin of the existing Floras. The tertiary flora contains representatives of all the recent floras of the globe. This theory, said the Baron, I have put forth for 25 years in my publications on the Austrian Tertiary Flora *(Abhand Reich)*. During this time this theory has become more and more self evident. The Loan Exhibition has afforded an opportunity of arranging specimens together, and bringing an illustration of how the elements of the existing floras come from the tertiary. In the European tertiary floras the ancestral type of the present indigenous flora are met with without doubt. This is seen in the genera Pinus, Alnus, Quercus, Fagus, Ulmus, Acer, &c. The transformation from some of the tertiary species to the species of existing flora can be traced step by step through various formations. Coeval with the indigenous flora one finds sometimes on the same slabs representatives of the floras of America; for instance in the species of Seguvia, Taxodium, Myrica, Liquidamber, Carya, Tetrapteris, Robinia, &c.; representatives of the Asiatic flora, such as Glyptostrobus, Planera, Cinnamomum, Engelhardtia, Ailanthus, &c.; analogies of African forms in the genera Widdringtonia, Callitris, Pterocelastrus, Rhus, &c. When these facts are considered with regard to the Australian flora, it seems probable that this flora is also contained. One cannot doubt this, since there are found the genera Casurina, Leptomeria, Hakea, Dryandra, Banksia, Eucalyptus, &c. Now comes the question, how it happens that the flora of other quarters of the globe come to be found mixed together in Europe in tertiary times. There are but two courses open: either their assemblage is the result of accident, or they were indigenous. The first supposition is impossible, since no fallen leaves could have travelled so far, for even the most delicate and tender parts are well preserved. It is more probable that they were preserved on the spot where they grew. The European and exotic forms are all also in equally good preservation, which would not be the case had they come from different distances. From this we conclude that they grew where they are found, and formed a really indigenous European flora. It cannot be accepted that they have travelled from different parts, but rather that in the tertiary time Europe and the other continents were united - for many of the plants could not have travelled by sea—and they have all sprung indigenously from the same spot. From these facts we deduce the following important conclusions as to the derivation of existing floras from the tertiary flora. The elements or groups of types of ancient floras have been developed and spread over different parts of the globe in different ways; generally in each direction one group has been developed more than the others, and the remainder appear scarcely to have survived. The elements which were best able to survive changing conditions have become characteristics floras, as in Australia, the Cape, &c. Since all the elements of the tertiary flora had an equal development, we find that each recent flora has preserved the mixed character of its origin, as in the flora of Sumatra and most tropical countries.——The PRESIDENT thanked Baron Ettinshausen for the trouble he had taken in arranging his typical collection in the Exhibition, and also for the paper he had read.——Prof. WARINGTON SMYTH, F.R.S., Inspector of Crown Mines, said he had come expressly to hear the Baron's paper, and warmly thanked him.——Prof. DUNCAN, F.R.S., President of the Geological Society, also thanked the Baron, and spoke of the importance of his work.

Mr. J. S. GARDNER, F.G.S., then read a paper on the Eocene flora of the Hampshire Basin. The deposits to which these notes referred are of Lower Bagshot age—that is, they occur between the marine Eocene formations of the Bracklesham Sands and London clay. The district embraced is situated on the southern borders of Hampshire and Dorset, extending from the Purbeck Hills to the Isle of Wight. The beds consist of sands and clays. In the lower part they are of pure white pipe clay, extensively worked for commercial purposes. In the upper part they consist of brick earths, sands, and grit beds. The leaves in the lower part are colourless; in the upper they preserve the brown or black tints of decaying leaves. These beds are extremely thick towards the west, continuous beds of pipe-clay at Creech Barrow, under the Purbeck Hills, being upwards of 100 ft. thick. At Alum Bay they are but 15 ft. thick; at Whitecliff Bay, in the east corner of the Isle of Wight, they are thinned out to almost nothing, and resemble sea sand, with traces of leaves. The leaves there bear every apperance of having travelled a long distance. The beds of clay and coarse quartzose source are from a granitic sand, and are the result of disintegration of high land to the west. The horizon of both the Alum Bay and Bournemouth series is perfectly defined by the marine beds above and below it. The age of the bed is, therefore, not argued from the leaves, as has been the case in many other instances. The collections made from these beds are thus of great importance, as being of well ascertained age. They are further important as comprssing the only extensive series of leaves of definite Lower Eocene age, except, perhaps, that of Monte Bolca, the flora of which has not yet been described. The relative age of many deposits on the Continent from which leaves have been described is not determined with certainty, but, with the possible exception mentioned, none are older than Miocene or Upper Eocene. The suites of specimens are sufficiently extensive to be taken as fairly representative of the flora of the period. Mr. Gardner then referred to the extensive collection of leaves from Bournemouth exhibited by him in the adjoining gallery, and among other points mentioned that Baron Ettingshausen had undertaken their determination. The beds have been supposed to be marine from the fact that teredo-bored wood has been found in them, but, as it is now known that teredo will live in fresh water, this argument falls through.

The Rev. NICHOLAS BRADY, M.A., made a communication on the desirability of a uniform international notation for crystallography.—*Times*.

THE MONETARY AND SILVER QUESTION IN AMERICA.

COL. BERTON'S FIRST REPORT, ADDRESSED TO THE DIRECTOR OF THE FRENCH MINT.

To Mr. L. RUAN, Director of the French Mint, Paris.

SIR,—In conformity with instructions of Mr. Léon Say, Minister of Finances, I have the honour to transmit to you my first report upon the several questions which you have requested me to examine in America. I should state at starting that since my return to the United States, some two months ago, I had to devote a great portion of my time to collect, with the kind permission of the Hon. B. H. Bristow, Secretary of the Treasury, and Dr. Linderman, Director-General of the U.S. Mint at Washington, all information and documents which were needed to commence my investigation of the monetary question in the United States, the solution of which interests Europe, India, and China, not less than America. The discussions which have already taken place, and which are still pending before Congress, indicate that the monetary question has become, owing specially to the depreciation of silver, the great preoccupation of the American people, and which will predominate among the political questions to be shortly discussed during the course of the Presidential campaign of 1876. It is, therefore, allowable to assert at present that the two great national parties which divide the Union will seek, before all things, in their Presidential candidates the qualities required to facilitate and hasten the solution of the financial difficulties the inevitable result of the enormous cost of the late Civil War, and which to-day have become more complicated by the depreciation of silver, and by the existing uncertainty in regard to the possibility of resuming specie payments at the epoch of Jan. 1, 1879, as fixed by Act of Congress.

Owing to the urgency of these two questions—the depreciation of silver and the resumption of specie payment—I thought I ought to submit without delay the summary result of my observations and enquiries which I have been permitted to make at the Treasury Department and at the U.S. Mint.

WHAT ARE THE PRINCIPAL CAUSES OF THE DEPRECIATION OF SILVER?—I do not hesitate to answer that the depreciation of silver must solely be attributed to the demonetisation of the silver coins in Germany, to the rapid accumulation of that metal on the London market at the time of a great business stagnation, and, finally, to the marked diminution in the importations from India and China. It will be seen later that the increasing production of a few silver mines in the State of Nevada cannot be reasonably considered as one of the causes of that depreciation, and that it has been only the pretext thereof in the hands of speculators on the English and continental markets. My detailed reports upon the compared yield of gold and silver mines will sufficiently prove that the depreciation of silver has been but the result of the causes above stated, and that it must, consequently, be considered as purely accidental. Therefore, I will confine myself in this my first report to submit only a few general remarks, with the object of bringing to light the questions connected with the production of the precious metals.

The total production of silver through the whole extent of the American continent since the discovery of the New World, in 1492, cannot be estimated at less than $5,500,000,000, nearly all of which has been absorbed by China and the East Indies. Estimating the population of these two countries roughly at 550,000,000 souls, we have $10 *per capita* in silver absorbed in 350 years—that is to say, since the time of the working of the first silver mines in the New World. That sum of $10 *per capita*, taking into consideration the great wear and tear of silver coins and manufactured articles, the loss by fire, and other causes cannot be considered a large amount.

These Asiatic nations will continue, no doubt, for centuries to come to make nearly as extensive a use of silver as they have heretofore, and the fact that a few hundred millions of silver have been suddenly thrown upon the market cannot, in my opinion, permanently affect its price, or, under any circumstances, cause a much greater depreciation of its value than has already taken place. The annual yield of the celebrated silver mines, which I have again recently examined, on the Comstock lode in Nevada, as well as the leading ones in the other Pacific States and Territories, will, whatever may be its importance, exercise but a slight influence upon the value of that precious metal, for an active resumption of the importations from Asia will rapidly absorb the surplus which now gluts the moneyed centres of Europe and America. In a speech recently delivered before the United States Senate by one of its members from Nevada largely interested, it is true, in several silver mines in that State, it was said, with a certain amount of exaggeration, not lacking some truth, that "it would be as difficult to saturate with gold the peoples of Asia as to saturate with water the sands of a desert."

There is an important fact to which I ought to direct your attention, and which I shall take up again in my reports upon the production of silver mines—it is that the net yield in metallic value of the most productive mines in Nevada is of an average of 43 per cent. in gold and 57 per cent. in silver. Thus, it will be seen that the value of the quantity of silver extracted from these mines does not exceed by 14 per cent. that of gold which they yield. Such properties may, therefore, be regarded as being at the same time gold as well as silver mines. The above fact, which is not sufficiently known in Europe, can be used as an argument of great strength by the advocates of the double money standard in Europe and America, and also by those who rightly believe that silver has experienced a temporary and unmerited depreciation since the demonetisation which took place in Germany nearly simultaneously with the extraordinary yield of the two great silver mines of Virginia City.* The well-deserved reputation of these two properties has been used by speculators as a pretext to circulate the most exaggerated reports upon the wealth and yield of numerous other mines located upon the same Comstock lode, and the result was a false interpretation of the fact and state of things such as exist in that locality, which I have just re-examined, and upon which you will soon be thoroughly informed by my reports on the few productive mines situated therein.

RESUMPTION OF SPECIE PAYMENT.—The Act of Congress, which fixes Jan. 1, 1879, for the realisation of that great financial event, has been the subject of the liveliest discussion, not only before the American Congress, but also upon the part of the press, as well as between the politicians of the two antagonistic parties in the United States. The Republicans have used it as an electioneering manœuvre by which they hope to fascinate the people, and thus obtain its votes for their Presidential candidate who shall, be he whom he may, insist for the execution of the Act of Congress. The Democrats, on the contrary, have up to the present time pronounced themselves in favour of the *statu quo*, and the repeal of that Act. I have reason to believe that both political parties will soon unite in the same sentiment in regard to such an important question, which affects the credit as well as the prosperity of the nation, and the solution of which is of general interest. For my own part, I do not hesitate to say that there is not the slighest possibility such a finan-

* My first report upon these two mines—the Consolidated Virginia and the California—has been published in full by the London *Mining Journal* of March 13, 1875, and by the Paris *Journal des Débats* of March 6 of the same year.

cial wonder can be effected upon the terms and at the time fixed by the Act of Congress.

The financial affairs of a nation cannot altogether be regulated by law, and when it comes to establishing confidence in the capacity of a Government to pay its indebtedness there is, in my opinion, no legislation which can affect it. Owing to the great reaction and depression which have taken place in the United States for the emission of a depreciated paper currency during and since the war, the American Government cannot seriously entertain the idea of enforcing the execution of the Act of Congress, the repeal of which, now urged by the majority of the people, would be one of the wisest measures of its representatives at Washington. In fact, it is already conceded that the resumption of specie payment can only take place gradually—that is to say, proportionately with the development of the immense resources of the country and the re-organisation of its finances under a restorative Government, having principally in view the consolidation of the credit of the United States at home as well as abroad. Once these great results accomplished the resumption of specie payment will become practicable without any forced measure, and will be the crowning of the efforts of that restorative Government.

WITHDRAWAL AND REIMBURSEMENT OF THE FRACTIONAL CURRENCY.—The Secretary of the Treasury, by virtue of the authorisation of Congress, is now busily engaged in withdrawing from the circulation the paper currency under $1, and to substitute for it silver coins of the same denominations. The enormous amount of labour required for the withdrawing and reimbursing of the fractional currency, estimated at the total sum of $44,000,000, has necessitated an increase of activity in the four Mints established in the United States—at Philadelphia, Denver (Colorado), Carson (Nevada), and San Francisco (California). It is principally the two latter establishments which I have recently visited, and especially that of San Francisco, which are coining at full steam the silver coins required by the Government for the reimbursement of fractional currencies, which are daily presented in large amount at the Treasury Department and at its authorised agencies in the States. These coins, of denominations corresponding to those of the fractional currency, for which they are now being substituted, are as follows:—Half dollars (50 cents), quarter dollars (25 cents), dimes (10 cents), and half dimes. In addition to the above a large number of 20-cent pieces are being coined, as they are preferred to the quarter dollars, of which there is a question of discontinuing the coinage. According to calculations made at the Treasury Department, it would appear that fractional currencies to the amount of $10,000,000 will never be presented for reimbursement, owing to their having been either lost or destroyed by wear, tear, &c. It will soon be ascertained how near these calculations may be correct; they might, after all, be but little exaggerated.

THE QUESTION OF SILVER.—It must be confessed that the American Government could not choose a more propitious time to secure at cheap rate the quantity of silver required for the reimbursement of the fractional currency. The demonetisation in Germany has just had its counterpart in America. Despised in the former country, accumulated and depreciated in London, silver has again found its natural friends in the country itself, which is one of its greatest producers. Such a fact is not of a nature to cause any belief in an early demonetisation of silver in the United States, nor in any permanent depreciation of that metal upon the English and continental markets.

The facts which are now taking place on this side of the Atlantic, and among them the Conservative measures which will soon be discussed before Congress, and the adoption of which seems almost certain, sufficiently prove that the Government at Washington has the intention of securing upon the most advantageous terms all the silver produced by the great mines of Nevada, as well as that of other States and Territories on the Pacific Slope, and that it will find a ready use for it at the periods which may be fixed for the gradual reimbursement of the greenback currency of $1 and above.

I have followed with the greatest care all the discussions which have been entered into by the leading newspapers and prominent economists in Europe as well as America upon the question of the real value to be allowed to silver in relation to that of gold. I have besides consulted here and at Washington men who seemed to be the most competent to enlighten me upon that important subject. I must, however, confess that I see no better plan to propose for the equitable and definite solution of the silver question than the convocation either at Paris or New York of an international congress of practical economists, financiers, scientific men, and directors of Mints of the leading American and European powers, who should be instructed to discuss in all its details that important question, to fix the present real value of silver in relation to that of gold for the coinage, and to have it recognised by their respective Governments. The project of a monetary union, which would not fail to have numerous advocates on both sides of the Atlantic, might become one of the most important measures proposed by that congress.

I thought it advisable, Sir, to submit to you in this first report my general remarks upon the principal points which I have investigated, and also the conclusions at which I have arrived after my course of studies and explorations, reserving details thereon for the subsequent reports, which I will forward to you shortly, upon the probable production of gold and silver mines on the Pacific Coast, the coinage of the United States, and the financial condition of the great Republic. JULES BERTON.

President of the London and Pacific Coast Mining Bureau.

San Francisco (California), May 12.

MINING IN THE EAST—No. IV.

MAIDANPEK MINES.—Historical notices on the mines of the old kingdom of Servia indicate that in ancient times these mines were as important and famous as they have been in later days. They are by far the most extensive in Servia, and the Government take an unfailing and sometimes very troublesome interest in all that concerns them. This mineral district is situated in the north-eastern corner of the Turkish province of Servia, a day's journey westward from Negotin, a town lying on the same plain as the Turkish fortress of Widin. A three-hours voyage up the Danube from the latter place reaches the celebrated remains of the bridge built across the river by Trajan, commemorated by a large Latin inscription engraved on the limestone, out of which the old Roman road along the right bank of the Danube was carved. Immediately above these interesting remains are the famous iron gates, and here the Carpathians cross the river and continue southward to the Balkans. On the crests of a spur of this auriferous range of mountains have been elaborated the rich cupreous deposits of Maidanpek, which have at intervals for so many hundreds of years employed the energies of various nationalities in their extraction and reduction. The town of Maidanpek—the centre of the large mining domain of the same name—is reached from Milanovatz, a steamboat station on the right bank of the Danube by a winding and mountainous road about 14 miles in length, which crosses the highest ridge 3000 ft. above sea level. The road, or more correctly track, though difficult and even dangerous, affords magnificent views of the Danube, and of the almost perpendicular escarpments by which this portion of it is confined, and through which at some remote period the river has forced a passage. Another way of reaching the town is from Gradisclite, a large village nearly opposite the Bajias Railway Terminus. From this place a level and excellent road leads to within a short distance of Maidanpek, but this distance is unfortunately occupied by a mountain some thousands of feet high, which renders it almost as difficult as the one from Milanovatz. The permanent population of Maidanpek and the villages surrounding is about 1400, and the number of workmen who camp in the woods vary from 200 to 500. The villages, seven in number, are scattered over the immense extent of forest and praries forming the domain, and all their inhabitants are engaged in the varied employments which the manufacture of copper necessitates.

These villages have each their distinctive duties to fulfil in the operations; thus the inhabitants of two villages are continually occupied in the fabrication of the vast masses of charcoal required to maintain the furnaces in activity. In another village dwell these carters, who in their primitive, though wonderfully elastic, oxen wagons transport wood from the depths of the forest to the machines, over tracks whose rugosities would infallibly cause the destruction of any English carts attempting to pass over them. In another well-built village, which nestles picturesquely under the high mountains bordering the large and well-watered plain in which it is placed, extensive farming operations are carried on. The two reduction works are surrounded by the houses of the workmen employed there. The village—or as here considered the town—of Maidanpek, containing about 250 dwellings, occupies a central position in the Domain, and is inhabited by the officers of the Government and the company, by the shopkeepers, and by the men employed in the mines, which surround the village at a small distance.

No less than eight languages are in general use here, and many more are occasionally heard; when the society of the place meets, however small may be the assemblage, the scene after the miracle at Babel is on a smaller scale again enacted. It may then be easily imagined that there are daily recurring difficulties in getting through business, much interpreting takes place, often very amusing, in which the officers assist each other. The language principally spoken are, taken in the order of their importance, as follows:—Wallachian, German, Servian, Bulgarian, and Italian, French being the official tongue. There are also a great number of gypsies, who communicate their ideas in a jargon of their own.

Of the 74,000 acres comprising this mining concession nine-tenths are clothed in primeval forests of white beech. There are, however, some small tracts of oak glades, and through the beech forest are interspersed linden, plane, and ash trees, and more rarely the sycamore. The remaining tenth is open meadow land, situate either in the larger valley flats, or picturesquely embossomed in forests, often on the spurs of the mountains, whence can be glimpsed enchanting views over the Domain, which is wonderfully accidented, abounding in bold and rugged escarpments of limestone precipitately sloping into deep and sombre valleys, in the depths of which issue large streams of cold sparkling water.

The forests are silent and gloomy, and are parsely frequented by deer and stags, but wolves and foxes are plentiful, and occasionally there is an alarm of a boar. In the clearings a few hares lead a precarious existence, and the only birds worth shooting is a specie of partridge, occasionally duck and geese pay a visit to the broad waters of the great Pek, and to the large reservoir constructed to store water for motive-power at the smelting establishments.

The history of Maidanpek is somewhat interesting. Vague traditions imply that the mines had been worked during the existence of the Roman Empire, but no remains justifying such an implication have ever been discovered. It is, however, not improbable, as mines in the immediate neighbourhood show evident traces of Roman occupation. There can be little doubt that the mines were extensively worked by the Venetians. The numerous and immense burrows of slags scattered along the principal valleys radiating from the mines confirm the traditions of its exceeding richness in ores of copper. Early in the 18th century, during the ascendancy of the Austrians over the Servian tribes, energetic endeavours were made to discover and open the valuable surface deposits of Seavia. Maidanpek appears to have been one of the earliest opened. Operations were commenced at the Brankovitz Mines in 1720, and Ingovitz galerie was cleared and a smelting furnace erected, and the various operations rapidly extended. The concern was worked for the Austrian Government, and was managed from Oravitza, the chief mining town in the Banal. Great exertions were evidently made to erect reduction works, reservoirs, &c., as the estimated production of copper for the year 1735 amounted to 300 tons. Unhappily the defeat of the Austrians by the Turks at Nissa threw Servia again into the hands of the latter, and resulted in the almost immediate closing of all the mines. Early in 1737 the mining staff left, and brigandage soon cleared the place of inhabitants, and the gradual destruction of the place ensued.

An examination of the old MSS. at Oravitza gives some curious and interesting particulars of Maidanpek. Amongst the papers is found a statement of the price of provisions on the Plaza during 1736:—Beef or mutton 1½d. per lb., wine 1½d. and beer ½d. per quartz, and wheat 7s. 3d. and maize 4s. per ton. More than a century elapsed before any attempt was made to resuscitate mining industry in Servia, and the opportunity occurred when the autonomy of Servia was acorded by the Sublime Porte in 1829.

About 1850 the Servian Government organised a party to thoroughly inspect Maidan, and report on the advisability of re-opening the mines and erecting reduction works. This commission had some difficulty in finding the mines, all the houses having disappeared, shafts and levels fallen in, and the "burrows" shrouded and concealed in a thick forest. Very few remains were found of the works or dwellings, only the massive walls of the ancient church, ruined and roofless, remained to mark the site of the former village. The interior of the church was overgrown with large trees, as was also the large plain, formerly dotted with dwellings. Amongst the surrounding hills a few wretched huts were found, occupied by Wallachian squatters, who lounged away in entire idleness their aimless lives. The report was favourable, and the Government bought up the squatters and destroyed their *salasches*, forming out of them a large mining domain, to which was conceded 74,000 acres of forests and many peculiar privileges, the most important being the remittance of all taxes, right of introducing supplies free of Custom dues, and freedom of all employed in the mines from military service.

In 1851 the works were commenced and pushed forward with extraordinary energy, and in a short time seven well-built villages, two copper works, and a complete establishment for the reduction of iron and its manufacture, were erected and put in operation. A quarter of a million sterling was absorbed in these preliminary works, which were all executed by foreigners, principally German, the nation being so newly independent that they possessed no knowledge of the arts or manufactures. The Government not being well advised, directed their chief attention to the production of iron, in which they failed lamentably, and the copper mines not giving immediate results, the continual drain on the exchequer induced the Cabinet to concede, in 1859, the whole concern to a French company for 30 years. The latter also directed their whole attention to the manufacture of iron from the brown hematite lying on the backs of the copper deposits, and erected large rolling mills four miles down the valley of the Pek. The iron containing a small percentage of sulphur and copper, it was found difficult to puddle it up to a good quality, and most of it was manufactured into cast iron goods. Neglecting the copper mines, they persevered for some years, but were unsuccessful in making it a commercial success, and an incendiary setting fire to their large magazines of charcoal stored for winter use in 1864 so disheartened the company that they abandoned the place. The persevering and continued attempts to set fire to the charcoal were extraordinary, and were said to have been made at the instigation of the Government officials who had lost their posts on the advent of the French. The unexpected cessation of employment reduced the workmen to the direst distress, and the Goverment found themselves obliged to recommence operations. This time they tried copper smelting, but only succeeded in expending more money, and they were much pleased to be enabled, in 1868, to make over the concession and its appertainings to an English company for 50 years.

The existing company have devoted their capital to the re-opening all the old mines, and the extension of the works for the manufacture of copper both by the dry and wet way, and have steadily eschewed any connection with iron reduction, although strongly pressed by the Servian Government to do so. EMPRESSARIO.

SWEETLAND CREEK GOLD MINES.

SIR,—The annual report of the directors has been issued to the shareholders, and a more dreary one it is difficult to conceive. Three or four years since we were told at every meeting that "there was enough gravel for 50 years." Now, "around the outer limits of the mine it is valueless." "The Orleans ground may be considered exhausted." "Much of the greater body of unworked ground . . . at present is of doubtful value." "With constant supply of water we can exhaust the ground of probable value in 12 or 18 months." Has the Sweetland entered the Emma and Flagstaff class? Have "50 years" dwindled down to "12 or 18 months?" Last year the Chairman at the meeting said that "they were paying considerably less for water than the original cost," "profits would be realised," and everything looked bright. Now, Sir, I hope someone will ask this question—If Mr. McLean knows the property so well, and having the gravel before his eyes, could he not have ascertained its value before incurring all the tunnel expense? The name of Mr. George Batters has induced many to join companies who otherwise would never have done so, and it would be satisfactory to many who cannot attend the annual meeting if he will, in his usual lucid manner, explain how it is our prospects are so changed and apparently blighted. A SHAREHOLDER.

SWEETLAND CREEK GOLD MINES.

SIR,—Your last Journal stated that the shares in this company were being "freely offered," and the directors' report with the accounts, since received by the shareholders, fully supplies the reason. Some behind the scenes, as usual, knew what was coming, and are reaping the profit. The object of this letter is to express a wish that the shareholders would assemble in a body at the meeting called for June 20, and determine on what course should be adopted in view of the prospects held out in the report. Until that meeting has been held I trust shareholders will not be frightened out of their shares at the present quotation, which certainly is not justified by the balance-sheet just issued. There are 15,000 shares, which at present price—20s.—makes the whole concern worth only 15,000*l.*, yet the balance-sheet shows we have cash and Consols in hand in London, 4399*l.* 4s. 9d., and bills receivable, 406*l.* 6s. 8d., making 4800*l.*, which leaves only 10,200*l.* for the value of the entire property, including cash—629*l.* 12s. 3d.—in Mr. M'Lean's hands, and all the stores and materials. The question, then, is reduced to this—Are the prospects of our mines, which during the past year have yielded a net profit of 7000*l.*, altered so suddenly that we must not expect any further dividends? Only such a view would warrant the present quotations, and I think my fellow-shareholders will agree with me that our position is not so bad as that, even though we cannot at present look forward to a permanent dividend-paying mine.

The state of affairs for the moment is very unsatisfactory, and call for some special attention from the proprietary. If there is nothing good in future prospects then let us wind up at once; the cash and Consols in hand will give us 6s. a share, and no doubt our property is worth a few thousands, especially as the title has been finally settled so recently by a United States patent. This course will, doubtless, not be entertained, but I would suggest that under existing circumstances the number of directors should be reduced, and I trust they will come forward and offer to continue the management without other remuneration than a percentage of the nett profits—say, 5 or 10 per cent.—until we see more clearly what the future will be. Would it not be well to send some qualified person to inspect the property and report on its prospects? If shareholders will only come forward at the meeting I think they would advance the common good, and greatly strengthen the directors in any course they may wish to pursue. We may certainly thank them for the candour with which they have told us the worst, and no doubt our worthy Chairman will meet the shareholders' views with his usual liberality.—*June* 8. HOPEFUL.

NEW SULPHURET CONCENTRATOR.

SIR,—I believe the greatest difficulty encountered in turning the auriferous deposits of Wales to commercial advantage has arisen from the difficulty of dealing with the sulphurets; so that some account of how they have been successfully dealt with in California may not be uninteresting to the readers of the Journal. It is now pretty well acknowledged that sulphurets will not amalgamate, so that concentration has to be resorted to, and for a sulphuret concentrator I have seen nothing to surpass that of Mr. Charles Schofield, of this city; while in proof that I am not the only practical man who entertains this opinion, I may say that very flattering testimonials have been received from some of the best men in the State. Thus, Prof. J. E. Clayton, whose name is, I think, known to some of your readers, writes that having followed the business of mining engineering for upwards of 30 years, and having had in this connection much to do with regulating machinery for saving gold and concentrating sulphurets, and having in nearly every mining camp on the Pacific Coast examined the various kinds of ore concentrators in use, he will say that he has nowhere seen anything half as cheap and simple in its construction, scientific in principle, or effective in operation as the Schofield concentrator; whilst Mr. Levy Noyes, the superintendent of Bandereta Mine, Mariposa County, states that at their mill, where it has been in use for about six months, it saves over 90 per cent. of the sulphurets contained in the ore, and all of the amalgam and quicksilver which escapes from the battery. He, moreover, describes the machine as simple in construction, perfect in operation, requiring no power to run it, and is very economical. The opinion of Mr. G. E. Webber, jun., the superintendent of the Washington Mine, is equally satisfactory. He states that, having had one of the double-rigged concentrators in use now at his mill for over a year, he finds that it is far superior to the old English buddle which they have been using for the last four years, not only in a saving of labour, but having a less waste of sulphurets in washing. They have the machine connected with the tail sluicer; it receives the sand and water direct from the batteries, without any handling, and it does the concentration for the 20 stamps easy, with a loss of less than 10 per cent. Two Chinamen do all the work required, one night and the other day, working 12 hours each, and get out about 1 ton each day, thus concentrating 30 tons into one, at a cost of less than $4. As the cheapest, most economical, and best working concentrator he knows of, he can recommend it to others without any hesitation.'

The Schofield concentrators are constructed mostly of wood, and consist of two or more hopper-shaped boxes placed over a tank with four compartments, and as many small sluices 3 in. or 4 in. in width and 60 ft. in length, leading from the above tank to another below, which latter is divided into two compartments. A few inches above the real bottom of the hopper-shaped boxes is a false bottom, composed of a screen of perforated sheet-iron, beneath which is inserted a pipe conveying clean water from a tank above with at least 10 or 12 feet pressure. Immediately over and close to the false bottom are three perforated pipes through which the main portion of the water passes. A steady upward stream of water passes from these perforated pipes with sufficient pressure to prevent any light and worthless matter from passing downward through the screen against the upward current. The pipe under the screen is for throwing fine upward streams against the false bottom to prevent any chance of packing and closing the perforations. The pulp is conveyed from the battery through a sluice into the top of the first box, and all the coarse heavy sand and most of the sulphurets pass down through the screen and out through the discharge cocks into the tank below, but all sand and sulphurets which are too fine and light to resist the upward current of water in the first box pass on into the next box, and go through the same trial again under a diminished pressure of water, which results in abstracting a finer quality of sand and the remainder of the sulphurets. The quicksilver and amalgam stop in the bottom of the first box.

Quicksilver is placed under the false bottom of both boxes, in order to collect any particles of gold or amalgam which may have passed the ordinary mill process. The slums are separated and pass over the edge of the box with the waste water, thus being one of the most important features of this concentrator, and one generally overlooked in previous machines. When one or more apartments of the tank beneath the boxes are filled with sand plugs are removed, which let the sand flow into the small sluices, and a small stream of water is applied, which with the sand forms gentle undulations or sand riffs, which continually work the sulphurets down to the bottom, but carry the sand out at the end of the sluice over the lower tank. When all is out of the upper tank which will conveniently flow out, the plugs are replaced and the stream of clear water continued until the sand is all washed out of the sluices, the sulphurets are then carried by a stronger current and let out through a gate in the bottom of the last sluice into the tank below.

But perhaps the greatest advantage of the machine is that it re-

quires no power whatever, the only thing necessary being the amount of water which will pass a 1¼-in. pipe under a 12-ft. head. There being no motion or complicated machinery there is no perceptible wear and tear, and the appliance will last for years. The first cost is comparatively small, and the labour and expense of running is very light, one man being able to attend to it for a 20-stamp mill. It answers the purpose, as well as a sulphuret concentrator, of saving what gold and amalgam escapes from the battery. The manufacturers claim that it saves a larger percentage of valuable material from the sands than other machines, and offer a guarantee of saving 90 per cent. of the sulphurets contained in the rock. The machine appears to me to be one that would be extremely useful in Wales, and if any of your readers should be disposed to give it a trial I am sure the inventor will furnish all necessary details.

San Francisco, May 15. MINING ENGINEER.

BLAKELY HALL COLLIERIES, BIRMINGHAM.

SIR,—I read in last week's Journal that the hearing of this case was postponed until after the Whitsun vacation, as Mr. Plant's counsel was so busy. It is to be hoped that the preference shareholders and the debenture-holders, together holding coupons and scrip for 100,000*l.*, will not allow their property to be sold or given away for 17,200*l.*, but demand an account of what has become of the money, as all the debentures were taken up, and I presume there must be a large amount at the bank, but I am told it is no business of the debenture-holders to enquire, but as the interest on the coupons is stopped, and they are of little value in the market, I think Mr. Plant will not be induced to agree to settle the disputes until the trustees pay their clients the value of the bonds, as by their names and position they induced the public to take them up. Surely the trustees knew the value of the estate and that the company was of a sound character before they allowed their names to be printed in the prospectus. Myself and friends would not have taken a share (at any price) or a debenture but for the knowledge of the position of the trustees, who ought to see us protected. TENAX EXON.

Exeter, June 6.

BORING MACHINES FOR MINING.

SIR,—You could bear testimony to the fact of my having for a considerable time past, through the medium of your valuable Journal, called the attention of mining adventurers to the importance of the introduction of boring machines in mines, in order to make and keep them remunerative. Although at first I had every reason to think my statements were considered by miners generally, and mine agents in particular, of a rather Utopian nature, yet now I find the mining public are getting more and more impressed with the facts laid down by me; and I am very glad indeed to see that some tangible movement is being made in Cornwall to give the subject more attention. All now that know anything of practical mining are convinced, or ought to be, of the absolute need of some relief for the unhealthy balance-sheets of too large a number of our mines. With respect, however, to another part of the subject—the practicability of successfully introducing any machinery into our mines so as to supersede hand labour—a very different opinion prevails, and not without sound reasons; for, notwithstanding all that has been yet said or done in the matter, it cannot be laid down as a settled point from actual trial that success has been generally achieved, and hence the hesitation with mining adventurers generally in moving in the matter. There are various reasons why better success has not accompanied the subject so far, which are very plain in themselves, and might have been obviated. It is not, however, my intention at present to go into that part of the question—it has to be fought out. That there are difficulties in the way no one will deny. The grand problem, however, is not whether there are any difficulties, but whether there are any difficulties that cannot be overcome. Having given the whole subject much close study, and being fully acquainted with the whole obstacles and circumstances in detail, I can only repeat what I have publicly stated—that no engineering difficulties exist that cannot be overcome in the application of boring machines to every hole and corner of any mine; and in such mines as are worked by means of blasting it can be done to effect a saving of 40 per cent. when compared with hand labour. The reasons why the boring machines have not answered better is almost plain enough.

Wenford, St. Tudy, Cornwall, June 7. GEORGE RICKARD.

EXPLOSIVES—DYNAMITE—GUNPOWDER.

SIR,—It is an indisputable fact that prejudice is one of the greatest hindrances to progress, and the great proof of the excellence of any novelty is its rising above this, and achieving popularity in spite of it. Had James Watt not persisted in his efforts, and George Stephenson withstood the opposing voice, we might now be slowly journeying from hamlet to hamlet, from village to town, in disreputable diligences, or shaky stage coaches. Every new invention has a torrent of opposition to overcome, but few have so much to strive against as a new explosive. Dynamite has been before the public ten years, and has just begun to be popular. Although the railway companies and the gunpowder makers, and many of the prime industries of the land, have hampered its use, spread distrust of its power, and alarmed the more timid by a whisper of its treacherous character, dynamite is still making headway, and, as the more powerful crushes out the weaker, so dynamite is superseding the older and more popular invention. Year by year, from the time when the point of the wedge was inserted by the sale of 3 tons in one year, until now, when the sale amounts to over a thousand times the quantity, the use has become more general. The great objection to dynamite is the presence of nitroglycerine. That deadly compound, so far renowned as a fearfully destructive agent, set the face of the public dead against it, so much so that a great deal of money is expended in teaching that it does not explode from a mere shock or an accidental concussion.

Another great difficulty has been the absence of men trained as blasters who can use the explosives to the best advantage. Much of the force is thus lost, and much money wasted; its originally high cost is rendered more apparent by excessive charges and general lavishness. In Cornwall miners get, from life-long usage, so much accustomed to put in a certain quantity of explosive—measured by "inches"—in the hole, that they explode the same quantity of material, thus wasting a very large proportion, and rendering dynamite altogether too costly. Then the unused, or rather unneeded vapour troubles them, and they complain that it makes their heads ache. These are difficulties, however, which time will remove entirely. But, after all, the great opposing influence to dynamite is its cost. A pound of dynamite costs 2*s.* delivered on the works in Cornwall, and this is the uniform rate at which it is vended all over the country. We are now writing of the most powerful kind of dynamite. Dynamite is, according to a very fair estimate, three times as powerful as gunpowder, and its cost is from four to six times as much as good blasting powder, which is from 36*l.* to 42*l.* a ton. It is evident, therefore, that dynamite possesses more advantage than mere explosive powder, or could not make headway. It shatters wrought and cast iron, wire rope (about the toughest thing made in iron), trees, and blasts clay with ease where gunpowder would be entirely thrown away. These cases of superiority (and even more might be adduced) enable the costly explosive to make headway. The opposition of the railway companies is most unjust, and were fullest investigation made, nothing would be evolved to justify their restrictions. Many railway companies refuse absolutely to carry dynamite, and others, whilst carrying it, charge most exorbitant rates, amounting to about 1-5th of a penny per pound per mile. This must hamper and cramp the operations of the dynamite company, and experiment has proved the action of the railway companies to be most unwarrantable.

The comparative safety of dynamite against accident has been demonstrated, and actual experiment under the most trying circumstances has shown that it is quite safe if ordinary care be used. That many explosions of dynamite, attended with fatal results, occur is well known, but these have been the result of the most deliberate carelessness. In Wales 15 men were killed by a light being dropped on a box of primers. In the North a man was killed from roasting dynamite over a smithy fire, whilst his unsophisticated comrades blew the bellows. In Cornwall, four years ago, some navvies put a box of cartridges on the stove as a companion to the kettle. These were not accidents, they were thoughtless experiments, deadly in their results. But this is being done daily; men play with their danger until the awful moment, when the sudden angry flash belches forth, when reason asserts itself for the second before a man, a band, or a family are lifeless corpses, when reason asserts itself and condemns them.

We have been fortunate in having to deal with dynamite; we have seen an immense amount of work done by it, and now more than ever we consider it the best possible explosive for general work and variable ground. In medium stone, perhaps, gunpowder is best, but where large cavities are found, and when the material to be blasted is soft and comparatively non-resistant, or tough and not splinty, dynamite completely surpasses all other explosives in the field.—*June 3.* N. B.

A NEW POWERFUL EXPLOSIVE.

SIR,—It will be interesting for your readers to learn that Mr. Nobel has discovered an explosive of much greater power than dynamite or guncotton, which, from its great safety and convenience in handling, and the facility with which it can be fired under water and in all weathers, is likely to prove most valuable for military and naval operations, and in torpedos, &c. The force is fully equal to, and rather exceeds, nitroglycerine, but it is free from its oily character and from the consequent danger from leakage, &c. It is, I understand, of a dry pasty character, something like soft, pliable india rubber. I expect that when offered to the public, which it will shortly be, it will be found greatly preferable to dynamite and guncotton, and all those modern explosives where great power is required. ENGINEER.

TRANSPORT AND STORAGE OF EXPLOSIVES.

SIR,—To anticipate that accidents can be at all times prevented in the use of any explosive which is extensively employed in connection with industrial pursuits is absurd, but it must be acknowledged that the relative safety of the several compounds at present in the market as blasting powders applicable to mining purposes are well worthy of consideration. At the present time, perhaps, more attention is directed to the question of the safety or danger of dynamite than to that of any other explosive, owing to the unceasing efforts of those interested in its manufacture to propagate the view that it is at least as harmless as ordinary gunpowder. The annual report of the Inspector of Explosives—Major Majendie—has just been issued, and will, it may be hoped, do something more to dispel illusions which many have hitherto indulged in although they have been so frequently exposed. In the nine months to which the report refers no less than eleven accidents occurred, resulting in fifteen deaths and injury to thirteen persons likewise. Thus the average is rather more than one per month, but where such very potent agents as gunpowder, nitroglycerine, and dynamite are concerned averages go for very little, as a single explosion, like that of Bremerhaven, in a crowded spot, may cause more calamitous consequences than a multitude of similar accidents in desert or thinly-peopled places, and the number and magnitude of the explosions are of far less consequence than their localities and circumstances. As one of the most prolific causes of accidental explosions is the recklessness resulting from ignorance, the Inspector takes especial pains to inform the public of certain popular fallacies with regard to the nature and dangers of dynamite. It has been said that dynamite "is quite inexplosive by either friction or percussion at any temperature, neither will it explode when exposed to fire alone." From this it would seem difficult to make dynamite explode at all. Major Majendie declares that both terms of the statement are "absolutely incorrect and dangerously misleading," and gives proof to that effect. It has been demonstrated by experiment that dynamite and lithofracteur when disposed in small quantities on hard substances, and subjected to percussion, are at least as liable to explosion as cap composition; and that as for the effect of flame on dynamite, experiments have been made which show that, although dynamite may sometimes burn without explosion, it is not to be trusted. Thus, in one instance, dynamite burned fiercely for about half a minute, and then there was a destructive explosion.

At the very moment when this report is fresh before the public, and whilst the lamentable dynamite accident at the Maesteg tunnel is still in the minds of most people, an effort is being made in Cornwall to induce the various railway companies to relax their rules with regard to its carriage. It is stated that all the dynamite used in this country is manufactured in Ayrshire, and carried by the Glasgow and South-Western Company to Glasgow, at which point the facilities for carriage by railway very properly cease. In view of this state of affairs petitions have been prepared in Cornwall and Devon for the purpose of getting the restrictions removed; but so much has recently come to light as to the way in which petitions are got up and signatures to them obtained, that much of their effect may be lost, more especially as of the 120 who signed them the proportion of intelligent mine managers may be small, and the "others equally interested" may include many whose opinion upon the subject, considered with regard to the safety of the public generally, may be thoroughly worthless; it may, however, be stated that the petition sets forth—

"That dynamite is manufactured and packed by the British Dynamite Company in strict accordance with the license they hold from Government; that large quantities have been carried in this country by rail, carts, and canals, without accident; that the highest testimony can be adduced to prove that it is safer than gunpowder packed in barrels; that for many years it has been carried by rail in the United States, Brazil, Austria, Sweden, Norway, Denmark, Italy, Spain, Portugal, and in almost every other State on the Continent where a railway traffic in explosives is permitted, and that down to the present time no accident has occurred in the transport of dynamite in any country, or by any mode of conveyance, and that no accident has ever occurred in connection with its storage."

On these grounds the railway companies are asked to carry it over their lines. Now, the petition is satisfactory as compared with some of its predecessors, as the assertion that no accident has ever occurred in transport has been omitted; but the arguments which it contains are not all quite tenable. It has been inferred that the dynamite is carried from Glasgow to the place of consumption by road, and it was, no doubt, by propagating this notion that many were led to sign the petition. Nothing can be further from the fact. The explosive is, it may be said, exclusively carried from Scotland to Cornwall by sea; and, with regard to cost of transport, it is beyond question that much less would be payable for the carriage by sea of a cargo of dynamite (say) from Glasgow to Falmouth than would be payable to the railway companies for the same service, supposing they consented to the prayer of the petition. Considering the cost of manufacture, of transport, and of storage, the price which the miners are made to pay is simply exorbitant, and it is these necessary restrictions which certainly do not materially affect the cost to the dynamite company, except very indirectly—that is to say, if the railways were open vessels could, of course, be chartered at somewhat lower freights—that are kept constantly before consumers as a reason for the retention of high prices.

That dynamite, lithofracteur, rhexite, Horsley's powder, and various other nitroglycerine compounds are more powerful than ordinary blasting powder has been well known and universally admitted for some years past, and it has never been denied that all the nitroglycerine compounds are perfectly safe so long as the nitroglycerine remains properly absorbed by the carrier material—whether it be kieselguhr as in dynamite, or wood powder, charcoal powder, or other absorbent as used in other nitroglycerine compounds, but to permanently prevent the exudation of the nitroglycerine is practically impossible, and it is the liability of the explosion of the exuded nitroglycerine that renders every nitroglycerine compound, without a single exception, particularly dangerous as compared with ordinary blasting powders. It was beyond question the exuded nitroglycerine that caused the destructive explosion of the dynamite, the first portion of which Major Majendie describes as having burned fiercely, but without explosion, for half-a-minute, and it may be that the Maesteg explosion was due to the same cause. This instability of the nitroglycerine compounds is the more to be dreaded because it leads some to claim for them a safety which they do not possess; and assuming the use of dynamite to continue, it may safely be predicted as soon as the manufacture is thrown open by the expiration of the patents, which at least protect the name however little they may be worth otherwise, the number of accidents will largely increase, and far more stringent rules than those now in force will have to be adopted. Nitroglycerine is so insidious a liquid that its permanent retention in any solid, whether kieselgur, charcoal dust, or other materials, cannot be relied upon, and all the nitroglycerine compounds have the indisputable disadvantage that the slightest carelessness in manufacture changes the material from a comparatively harmless one to one of the most dangerously destructive known. Ordinary blasting powder, and even the chlorate powders, are free from this danger—carelessness in manufacture resulting only in an inferior quality of finished material. In the case of guncotton and its analogues, carelessness of manufacture may produce a more dangerous material, but this can never be finished for the market without exploding, and the finished article, although liable to deteriorate in power, can never increase in danger by storage or otherwise.

Referring to the carriage of explosives, Major Majendie mentions the Bremerhaven explosion as illustrating the enormous power of the agent used, and from special information which he obtained it appears that the premature explosion of Thomas's infernal machine was due to a defect in the mechanism, which had been constructed, according to the owner's directions, for use in a factory, and was not designed to withstand the shock of a violent concussion, such as received at Bremerhaven. As the explosive agent used in this case had travelled from Cologne to New York and back, it seems probable that if the New English law had been in operation in Germany, Thomas's experiment would have been impracticable, and the catastrophe would have been averted. That the operation of the Act which Majendie has to see complied with will prove beneficial to the public appears to be beyond question, and it is difficult to find any provision in it of which either manufacturers or users of explosives can reasonably complain.

ENGINEER.

PERILOUS ADVENTURE.

SIR,—Having accomplished a sea trip from Yarmouth to London in a mere model of a safety-boat, 9 ft. in length, and proved it to be self-righting, with a mast 11 ft. and sails 12 ft., fore and aft set and secured, it is manifest that fewer lives need be lost at sea. Overweighted with iron, &c., in her bow, she ran only 4 in. clear, and in no part was she more than 12 in. from the surface. I lost my rudder at Cacton-on-Sea, and steered by a small oar for 80 miles. Deducting time for rest and communicating with friends, I made the voyage in little more than 30 hours. Damaged at Southend, I am delayed for repairs before I can cross the Channel.

If those who have the guardianship of the lives of colliery workers will even now waive their prejudice, and investigate my gratuitous suggestions for perfect ventilation, we shall hear but little more of "colliery explosions." C. COLWELL.

Allen's Buildings, Finsbury.

THE TIN-PLATE TRADE.

SIR,—In last week's Journal there is an article on this subject by Mr. Richard Meade, of the Mining Record Office, having more particular reference to the Forest of Dean. The statistical information is possibly pretty correct, but he has evidently been depending upon statements in some books which have in some measure misled him, especially as regards the ordinary size of tin-plates—13¾ by 10, 225 sheets, 1 cwt. (112 lbs.)—that has not been the case for the past 30 years; 14 by 10, 225 sheets, 1 cwt. (112 lbs.), and 20 by 14, 112 sheets, 1 cwt. (112 lbs.), are the standard sizes; but at the present time they are made in a hundred different sizes, as may be required, such as 19⅝ by 16⅝, 14⅝ by 10⅛, &c., so as to cause but little loss in clipping for the various purposes for which they are now so generally used. Your correspondent is also in error as regards the quantity of tin used in box of tin-plates, or, more correctly iron-plates tinned. The quantity used 25 years ago may be roughly stated at from 8 lbs. to 9 lbs. for fair coke, and 9 lbs. to 10 lbs. for charcoal plates. Now, the former has but 4 lbs., and the latter about 5 to 6 lbs. metal per box of 225 steets 14 by 10, or 112 sheets 20 by 14—the patent rolls of Morewood working them to that limited extent.

With regard to the tin-plate trade being depressed, it is not more so than the iron and coal, and though the manufacturers are but working three out of four weeks, the production is not one-eighth less, as the workmen turn out much more than formerly, and the employers do not in any way check them; so, as for stopping two of every four weeks is a very dubious question. It is not likely to improve while such a system is being pursued. If, therefore, some makers cannot make a profit, why do they push the make during the three weeks while working? It seems very inconsistent and contradictory to trade reports in the different metal, &c., organs. Take the exports for three months of 1876, and compare with 1874 and 1875, and you will at once see that only as regards the United States has there been any falling off, and considering the Centennial and bad state of trade there, it cannot surprise anyone that the decrease should not have been greater. Take away United States—1874 will be 7066, 1875 will be 7548, and 1876 will be 9317, which, though small in comparison to the make, is still satisfactory. Again, though prices are very low, iron and coal have been reduced, and tin is very low, labour is likewise something less. With caution, and not speculating too fast, the tin-plate manufacturers will be able to weather the present unproductive times, and be well prepared to take advantage of brighter days, which will no doubt come again before long, but not such times as some two or three years back, when plates went up enormously, and fabulous profits were made by those who were in a position to take advantage of orders. These times come only in cycles, and cannot be foretold; so we must all live in hopes of reaping a fair harvest at an early day.

MAKER.

THE COPPER STANDARD, &c.

SIR,—Mr. Barnard has the modesty to undertake to teach "Bal Captains" and "Cousin Jacks" how to dress copper ores, and enters into a series of calculations to show that which any taker of an old halvan-burrow would explain more clearly in plain-spoken words. Without entering into the drift of his argument, I claim permission to enquire in what well-managed mine, or any other mine, Mr. Barnard has ever seen or heard of 10 per cent. ores being mixed with ores of 2 per cent. for sale at the public ticketings? The Nascent process may probably be referred to in a future letter.

June 8. A MINE AGENT.

DUES—CORNISH AND CROWN.

SIR,—In my last letter there was one particular circumstance omitted in regard to the exactions of the Crown authorities. In all Crown leases there is, or was formerly, a clause to the effect that in a case of re-entry for breach of covenants by the lessees the machinery, becomes the property of the lessor. The words are or used to be, "That upon a re-entry being made on behalf of her Majesty, her heirs, and successors, possession may be taken of all engines, tools, machinery, and other working gear and mineral substances and other matters then being in the said premises for her and their absolute use."

I will now, by way of illustration, give you an outline of a case that happened a few years ago, when this clause was put into practice; the parties who suffered had not knowingly or willingly of themselves committed any breach of covenant, but simply refused to be parties to the new and before unheard of imposition of "one-quarter profits to the Crown."

About the year 1862 a company worked a mine in Wales upon which something like 20,000*l.* had been spent, got to the end of their capital, and into liquidation. The mine was held under a lease from the Woods and Forests to a gentleman who held also other extensive grants, and assigned this one to the company referred to. The liquidator put up the mine, leases, and machinery for sale by auction, and it was purchased by four gentlemen—one a well-known Professor of Trinity College, Dublin, another a well-known physician, and two gentlemen in London, all of whom had lost money in the old company. To these gentlemen the leases were assigned, and their outlay had been about 1000*l.* when a few friends joined them with the view of working the mine privately to a more certain depth, to test its value before forming a public company. In this way they spent 2500*l.* (beyond the 1000*l.* mentioned). They sunk the shaft to the 34 fm. level, drove trial levels, proved the lode to be very large, and composed of masses of blende, under which there was every reason to expect good deposits of lead—the same as in other rich mines in the district which had similar deposits of blende above the lead. They raised and sold about 300 tons of blende, and the agents estimated that their exploratory work had also laid open several hundred tons more of that metal. With a view, therefore, to work on a more extended scale, and to get a return for their risk and outlay for some three or four years, the proprietors in 1866 proposed to form a limited company, and to take, in shares only, what it was considered the speculation had been made fairly worth; *all* the *money* raised was to go for working capital.

At this point, however, they received a notification from the Woods and Forests that the dues and dead rent were in arrear. They replied that they had regularly paid up all rents and royalties, together with the receiver's fees, and held all the receipts from the party who had assigned the lease to them. That gentleman, it subsequently appeared, had not paid the Crown, but the holders of the lease immediately sent another cheque to the Woods and Forests (thus paying twice), and offered to do anything that the Crown might require or suggest under the circumstances.

After a time and some correspondence on the matter the Woods and Forests suggested that the assignment of the old lease should be given up, and a new lease taken direct from the Crown. This was readily assented to, and was then considered rather a gracious

act on the part of the Woods and Forests; but this feeling subsided and was turned into astonishment when, on receiving the terms for the new lease, the parties who had risked some thousands of pounds in working the mine for more than three years found they would have to hand over to the Crown (in addition to a heavy royalty and increased dead rent) one-fourth part of any profit they might make by selling the mine to a company or by otherwise disposing of it. The parties refused to accept a lease on any such terms, and after a long correspondence were at last plainly informed that if they still refused to take it with that proviso the mine would be taken possession of, and granted to other applicants.

This was eventually done, and the "ousted ones" had to console themselves with the reflection that the machinery would at least pay the debt due to their treasurer of something over 500*l.*, even if they lost all the rest. But no such thing! The Woods and Forests had other strings to their bow, and meant to use them. Under the clause that "in case of re-entry for breaches of covenant by the lessees the machinery, &c., become the property of the lessor" they took possession of everything, and to this day the parties referred to have never received one farthing for the mine or machinery! And these circumstances, which I have endeavoured to give as calmly and as truthfully as possible after a lapse of some years, were brought to my mind on reading in the Journal of to-day a notice of the "liquidation of West Esgair Lle."

The Crown, or rather the authorities of the Woods and Forests, after dispossessing those who had spent so much money in proving its value as a speculation, sold it—machinery and all—for a certain sum of money to others, who brought it out as "West Esgair Lle," in 10,000 shares of 2*l.* each, and for a long time it was a prominent mine in circular and other advertisements at 30,000*l.*, and even 40,000*l.* It is now, I see, again under liquidation for want of funds, and some other company may reap the final reward, but I would ask the Woods and Forests, setting aside for a time the injustice done to those from whom the mine was wrested, what sum of money did they obtain for the mine and materials, and what did they afterwards receive from the promoters of West Esgair Lle as their quarter part of the profit on the sale to the shareholders of that company?

ARGUS.

LEAD MINING.

SIR,—Many important and interesting communications have appeared in the Journal since the opening of this year which ought to be studied by all persons having the mining interest at heart. Indeed, the columns of the *Mining Journal*, conceived and written with extraordinary caution, prudence, foresight, and experience, as they are, furnish a repertory of "underground intelligence," of the importance of mining, and of the *modus operandi* most likely to ensure success. Were a good pamphlet written, or a series of original, smart articles in your own columns, giving a review of the issues of the Journal for a year or a decade, a *resumé* of opinions and intelligence would be presented of an exceedingly useful kind.

It is not a new subject to call the attention of your readers to Lead Mining, but it is at present very pertinent and important. We are on the very eve, I am convinced, of an unprecedented demand for lead. The projected building operations of the "Board of Works," the "Metropolitan Board of Works," and various corporations throughout the United Kingdom, portend a vast consumption of this metal, which is now more used in buildings than at any previous period, although zinc is gradually displacing it for roofing, especially on the Continent, where it is almost universally preferred to lead or slate, but in every other department of new or renewing edifices lead holds an important place previously unknown.

The late destructive war in France has rendered re-edification there of the most urgent importance, and the protracted civil war in Spain has been attended with the destruction of barracks, town halls, courts of justice, churches, and almost all public buildings in the northern provinces of the Peninsula. The work of pacification now accomplished must be followed by reconstruction.

In the United States of America there has been a great check to building since the opening of "the fall" of 1874; but now as commerce is reviving, migration from the eastern sea-board, and from New England to the West from the slopes of the Rockey Mountains to the shores of the Pacific, is again renewed, and wherever men from the Eastern and Northern States settle down churches, courts of justice, schools, and municipal institutions spring up as if by enchantment. In that great field of progress alone the demand for lead will probably be equivalent to the whole production of our mines. It is then wise, well, and the right time for the capitalist and man of science to give attention to the lead-bearing districts of the United Kingdom, now presenting numerous secure and profitable opportunities for investment.

It is remarkable that, taking the 12 months beginning last Midsummer day, there has been a protracted season of depression generally in the markets for investment. There has been business undoubtedly for the "bulls" and "bears;" and "stags" have looked up again. The rapidity of political events, the gloomy prospects, and revolutionary doings in Eastern Europe, and the collapses in the national finance of various nations which have taken place, gave scope to Stock Exchange speculations, which, on the whole, have been disastrous. British stocks, especially railways, were firm, and although the stagnation of our export trade was unfavourable to the banks and discount houses, on the whole bank dividends have been satisfactory.

The metal trade greatly depends upon the exports, for not only are the metals pure and simple sent abroad, but in the form of manufactures of every conceivable kind foreign markets are sought for them. The depression in the export trade, therefore, extended to metals, but was felt in the lead market least of all. This metal, with its accustomed relative and absolute steadiness, maintained values, and the United Kingdom did not produce half enough for the demand, showing very decisively that the time has now come when this department of mining should receive very much more practical and earnest attention, and, indeed, every department of British mining for the superior metals. Tin, although improved in value, does not maintain a very high market, and the difficulty of the produce of our deep Cornish workings competing with that of foreign surface workings, as those of the Great Eastern Archipelago and Australia, must be obvious.

The copper market is rather unsettled, and hardly offers scope for immediate speculation. We can, however, with confidence and conscientiousness repeat the words of a recent writer—"It is in looking to lead mines that the prospect everywhere brightens, the promise of the future surpassing the review of the past." In reference to these the language of the same writer as to mines for the superior metals generally especially holds good:—"The present is a time when British mines appear to be the best species of property both for investment and speculation; the *bona fides* of the majority of the mines lately opened up having been proved, satisfies the former, as the briskness of the market does those the latter."

Our commerce in lead during the year 1875 will confirm these quotations and our own remarks. During that period British lead was exported to the value of 826,046*l.*, about the same as in the preceding year, and a little more than in 1874, proving the steady market for this metal. Our imports of foreign lead, pig, and sheet amounted in value to 1,803,693*l.*, an increase of 20 per cent. upon 1874, and about 22 per cent. upon 1873. None of these imports in any of the years named were sent away again, as is invariably the case with our imports of tin, copper, zinc, iron, steel, &c. The Government returns for the present year present corresponding phenomena, our export of British lead increasing at the rate of about 25 per cent.

From these facts it is obvious that we have a demand for more than four times the quantity of lead which we raise, and in view of the projected building abroad and at home, to which we have referred, and with any general revival of trade, this country is scarcely producing one-eighth the quantity of lead wanting at home, and which our foreign customers would require. Under these circumstances why is not new ground broken? Why are not silent mines again resounding to the pick which were abandoned by their proprietors, not because their working would not remunerate, but because the shareholders did not agree, or because they would not or could not advance the requisite capital? There are now in Cardiganshire, Flint, Denbigh, Montgomery, and Merioneth large areas of ore ground where legitimate investors would find ample employment for their capital. There is also room for small investors, as lead mines are often worked with less capital than any other description of undertaking. We will give one instance of an inviting investment, and if we cannot say *ex uno disce omnes* we may say from one learn many. A company has been formed to purchase and work the Bodidris Mines, with a capital of 30,000*l.*, in shares of 1*l.* each. The property is situated in the great lead-bearing geological strata upon which the well-known mines of Denbigh and Flint rest. The yield is already productive, and must be more so as the company is about to open up a grand junction of lodes, from which there is every prospect of prolific returns. There is every reason to believe that this will be one of the best of the many good investments in lead mining in South Wales. Were we to write a volume we could not more fully put the prospects of this *bona fide* undertaking.—26, *Finsbury-circus, South, June* 8. J. J. REYNOLDS.

DEPOSITS OF COPPER AT NANTLLE VALE, CARNARVONSHIRE.

SIR,—On the back of the lodes where they are the most productive there are large deposits of iron pyrites, which is occasionally mixed with galena and blende, the latter occurring more at Drws-y-Coed than at Symdde-Dylluan. On the outcrop of the lode in the western section of the latter mine there is an abundance of iron pyrites, under which and near to it one of the largest courses of ore in the mine was formed. On the outcrop of the same lode in the eastern section the same mineral was deposited, but not so abundantly, and also on the back of the south lode the same phenomenon occurs, but the bottom of the pyrites has not been sunk through, and hence the value of the lode is not proved. I have often thought it a pity that this should have been neglected since the north lode proved so productive under similar circumstances. At Drws-y-Coed Mine the pyrites is mixed with galena and blue blende, similar to the blende at Parys Mountain Mine. On one of the extreme south lodes, the value of which has not yet been proved, there is a very large outcrop of these minerals. Since the present company has been formed they have commenced an adit level in order to prove it at a greater depth, and if analogy holds good they will get amply repaid for their outlay.

To return again to the slides, there is one feature in connection with them that I have not yet noted, that is some of them are capable of transmitting through them any amount of water. For example, the principal one in the eastern section of Symdde-Dylluan is so porous that the moment the deepest level strikes it those above are drained directly, and in the western section in driving across one of them at the 90 fm. level the water was drained from the 36 fm. level. What do we learn from this? That water was the prime agent employed by Nature in the deposition of the large courses of ore. I do not see what other conclusion we can arrive at since we have seen that the copper is not deposited in any large quantities far away from these slides.

As one of your correspondents said, in reply to Mr. S. Trevethan, in the Journal of the 27th ult., it is idle to suppose that matter is stationary, and as things were in the beginning so they are to this day. Not that the Creator could not at once perfect his work, but we know that such is not his method of working for reasons which can easily be explained, but as your Journal is not exactly the proper place for discussing such topic I will not enter on it here. An inspired philosopher writing on this point said, "There are a variety of operations, but it is the same God that worketh all and in all," What does this mean but that there are continual changes in as well as on the earth? Each element in Nature has its own prescribed law, in obedience to which their forces are exerted, whether it be in the analysis or synthesis of compound bodies. As matter changes its place and condition it must in obedience to the laws given to the atoms of which the body, of whatever kind, is built up, change its nature also. It is true that this operation in the crust of the earth is invisible, but sometimes here, as elsewhere in Nature, the invisible becomes visible, being clearly understood by the things that are made

To return to the subject under consideration; I have supposed water to be the prime agent employed in the deposition of copper here, because I know of no other fluid in Nature capable of containing and conveying the metallic elements through the veins. The question will naturally arise here which has been asked a thousand times—from where do the metals come? From the rock that surrounds the veins, or from the centre of the earth. It seems clear to my mind, from the facts which I have briefly described, that in this place the copper was brought up from below, held in solution by the water, through those fissures or slides. And it would also seem as though that the current was subjected to great pressure, for where the slide is pinched up and admit of but little water directly under it, there have been large deposits of ore, the regular channel having been stopped the water forced its way up through the softer parts of the lode, and between the layers of country rock when laying in an horizontal position. This will account for the courses of ore in the western section of Drws-y-Coed always making upon the slide and never under it. The question will be asked here if the copper has been brought up from below through those slides, why has not the copper been deposited along them as well as in the lodes? It may be that the current of electricity in the former was not sufficiently strong to combine the elements. At Symdde-Dylluan, where the slides have carried the ore along with them from one lode to the other the lodes are very near together, and so the influence of the electric currents would extend from one to the other, causing such an affect.—*Carnarvon, June* 2. J. ROBERTS.

THE UNEXPLORED MINING GROUND OF CORNWALL.

SIR,—I am pleased to see that a move is being made in the right direction by the introduction by Mr. C. Bawden of new or unwrought mining ground. It is patent to all who know Cornwall and its rich families that their fortunes are due to pursuing this kind of mining, the risk being so little; indeed the loss of the whole amount required is comparatively nothing, while striking into a rich bunch of copper, as in the Gwennap district, will lead to great wealth. An instance of this has recently been shown by the discovery at West Poldice, in Gwennap, where, after an expenditure of from 2000*l.* to 3000*l.*, the property suddenly became marketable at 50 000*l.*, and there is nothing that will tend to raise the county's staple industry in public estimation more than the discovery of a few good and inexpensively worked mines in virgin ground. This is the impetus required to set "a-going" the great wheel of Cornwall's enterprise, and that success may attend such laudable endeavours is the wish of—*Redruth, June* 6. "ONE AND ALL."

UNWROUGHT MINING GROUND IN GWENNAP, CORNWALL.

SIR,—The great yield of the mines of this district is unparalleled in the annals of copper mining, and it is with this evidence that there yet remain to be found equally rich deposits of mineral in the new ground yet to be explored. The whole range of ground extending from the foot of Carn Marth granite hill, south of the run of mines known as the Great Consols, United, and Clifford, abounds in mineral veins. As far east as the River Fal here and there may be seen cropping out of the ground evidences of the existence of rich lodes in connection with elvans, and intersected by the much desired cross-courses. The history of all the productive mines in Cornwall may be traced to the lodes coming in contact with such crossings and upheaves, and it is, therefore, desirable in the selection of mining ground that it shall embrace not only east and west lodes, but the other great essentials conducive to the formation of metallic mineral. With this conviction I have no hesitation in saying that I have a section of ground which with a small outlay will be the means of opening up a new and valuable mining field, eventually placing this hitherto unprecedentedly rich district on the enviable footing it assumed about 20 years ago, a prospectus of which I hope to publish in an early issue of the *Mining Journal*.

Unfortunately, for the last 20 years too much money has been spent in resuscitating deep and worn out mines, which have only tended to prejudice the capitalist, to the great injury of the county, and it is only by the judicious selection of setts of virgin ground that the public can be reassured of the benefit accruing from the investment of capital in such enterprise; and when I have this fact before me, that the promotion money alone charged the public for such worn out mines has been sufficient to make a trial of the major portion of the unwrought mineral ground of the county, it is not to be wondered at that the public view mining with some degree of diffidence. That such mining as I advocate is a profitable enterprise may be seen by the vast amount of wealth accumulated by the forefathers of the merchant princes of Cornwall, made purely by legitimate mining, and it is to the return of developing of new and unwrought mining ground that we must look to the future of Cornwall's riches.—*St. Day, Cornwall, June* 7. CHAS. BAWDEN.

[For remainder of Original Correspondence, see to-day's Journal.]

THE WILD DUCK, OR SPORTSMAN'S ARMS, MEETING.

Cousin Will—"Well, men, I am very glad to see you again all hearty and well, and thinking that you would not like to wait, I've got a fine stew ready for you." "Now, that's av'n sure nuff," says Jemmy Down. "Well, for my part," says Jan Temby, "I'm very much of the same mind as Bengey D——s, when he went to order a coffin for his wife." "What was that?" was asked by several. "Why," says Jan, "when Bengey got to the town he met Dick R——r, and looking up at the town clock and seeing there was time to spare, he said, 'I tell 'ee what, Dick, we caan't live by the dead, we must live by the living; so lev us go into Tangey's and have a stew, boy, for I'd rather have a stew than a town clock any time,' and so would I. Bengey was a funny fellow, and said a was born without a shirt." Full justice was done to Cousin Will's stew, and all said it was a grand one. "I've got the boys down rullen a task to-day before I came up," says Jan Jewill, "to clear the pile of trade in the end; but I was sorry to see the boy Jackey crying, for a knocked his joints to pieces in that narrow ugly old level; so I made a swap with the boy Dick, and put a inside to rulley, and to put them in courage I told them to come up to Cousin Will's and they should have something to eat and drink." All the comrades agreed that it was a good plan to encourage the boys. "For," said Uncle Henry Treylon, "they'll make men when we are dead and gone; and here they are come." They stuck into the stew in earnest, but after a bit it was noticed that Jacky was eating no meat. "How is that?" says John Temby. "Why, he don't like fat," says Dick. "Not like fat! Now look here, my son," says Jan Temby "and hark to me, and mind what I say. You will soon grow up a young man, Jacky, and you must larn to like everything; for when you are a man you may go to scores of places where there's nothing but everything to be had. So what would ee do then, Jacky?" This was considered to be sound advice, and it was agreed by all the pare—boys and all—from that time out that everyone of the pare should larn to like everything.

"Have ee been thinking at all sos'e about our last discoose," says Jan Jewill, "and how it ess that no good new lodes and bals are found now as well as in old times?" "I think I could tell how it ess without any fuss or towse," says Jan Temby. "So could I," says Jemmy Down, "but should like to have Uncle Henry Treylon's opinion first." That's a good idea," says Cousin Will. "Well," says Uncle Henry "my words will be few, and very simple; and when you have heard you can judge for yourself. We are none of us young men, and all know that the last three or four generations of miners don't know nothing about costeening or searching for or discovering new lodes by dowsing, or any other way, or about gossans, prians, peach, cockle, and all the meaty staff that make the backs of good lodes. How should they, when they never worked in a new or shallow mine? I tell ee, men, they don't know one bit about it. They never had the chance to know, for so soon as able to work they're put in deep mines, and never see'd the changes in lodes from the gossans and rich bunches of ore to the hard settled lodes. Why, you know, comrades, as well as I do that one is no more like the other than a cow is like a hoss. Still, 'tes not fair play to blame a man for not knowing what he never see'd; but 'tes true, as you're living, that a man who always worked in deep levels is no good to search for new mines, and, except a few old men, all our miners know nothing about it. That's my opinion, and that's my reason for saying at our last mitten that the miners of this day are not to be compared to our forefathers for finding new lodes and new bals." "I think," says Jemmy Down, "that no man living can contradict Uncle Henry. Don't we all know and mind when we were little children, to see our faythers and granfers and the old neighbours dowsing themselves, and sinking pits and cutting lodes, and every man of them could van the stuff and tell the valley of it, and tell the tin, too, from woolfram or cockle. How many miners of this day could do this? This generation may be better pitmen, or timbermen, and know more about sinking deeper mines than the old men, but they don't know half so much about finding out bals; if they do, why don't they find them?" "I tell ee what it ess sose," says Jan Temby, "if scores, and hundreds, and thousands of our men that are gone to furrin parts knowed so much as the old men about finding new lodes, they need not go away. The fools for years past have all been crammed into the old deep bals eating off each other's heads, like muzed people, and if they had half the sense their granfers had could have made a good living up to grass by what they'd get out of costeen pits." "I can mind," says Jan, "when my granfer, 'es, and grammer too, was working in Newton Moor, and used to rise lots of tin from 20 to 30 ft. deep, and hundreds of their little drifts may still be found. When 'twas dinner or supper time, the women used to soundy from the heathstone for them to come up. The children with small kibbles and ropes hauled up the trade from the little shafts. This is the way all the Newton Moor, Old Tye, and all the ground up through Piece to the Bassets was hollowed out like a honeycomb, and there's scores of miles of lodes yet to be found in this and adjoining parishes so good, or better, than Newton Moor and Old Tye. The old men knowed the true gossans, and a true gossan never failed yet, and never will. But how many dandy miners now going about could know a true gossan if they see'd it from brown clay? I tell ee, comrades, if we wish to have new bals, and good bals—party shallow, profitable little concerns—and scores of them in all directions, we must now larn and practice the old lesson." "Come, now, Jan Jewill, and lev us have your opinion?" "I caan't dispute with ee at a'l, comrades," says Jan; "and 'twas like bringing back my young days again while Jan Temby was telling about his family working in the Newton Moor, for I know 'tes true; but, there's one thing we must mind in looking for new lodes, and that is, 'Becky's advice about new lodes.' We must keep clear of that if we expect to have good bals. While I was harken to ee, men, I began to think that all the great and rich copper mines in these parishes first made tin in the gossans and shallow levels. Wise men know where to find good gossan (tinny backs of lodes), and they'll as surely make rich copper mines—as sure as ever there was a copper mine in Cornwall. Why, the people must be wuss than muzed to think that copper mining is done in our parishes. Why, bless your life, there's ten times more copper mines to be discovered than ever was yet discovered all about us; but they waan't be found by Government inspectors or men, or capns who have all their days seen nothing but deep mines, bekase you see that deep mining belong to this age, and shallow mining to a former age, and we must use the former plans for finding new bals or we shaan't find them. There's copper enuff all about us to supply the world without going to furrin parts for it; but our great men are got so wise and grave that they'll go 10,000 miles for a thing and a better one at home, and its my opinion sose that they and lots more going about are no more good than a passle of buckas to frighten away crows."

—*Cousin Jack's Unpublished M.S.*

Meetings of Public Companies.

YORKE PENINSULA MINING COMPANY.

The annual meeting of this company was held on Thursday, the 8th inst., at the Cannon-street Hotel,—Mr. F. P. WARD in the chair.

The notice convening the meeting having been read by Mr. C. GRAINGER (the secretary), the report was taken as read.

The CHAIRMAN observed that he met the shareholders on the present occasion with an account of the affairs of the company the character of which was very encouraging—much better, indeed, than he had ever known it to be. There were several points of great interest in connection with the company's present operations and future prospects on which he would make a few remarks. In the first place he would state that the Kurilla Mine is at present the point of greatest immediate importance. The work that has been done during the past year upon it has resulted in developing into greater prominence all the favourable features of the mine which were apparent when the directors last met them. The future of the mine is no longer dependent on one lode only, good as that has proved itself to be. There are three lodes considerably opened up, all of which are ore bearing, and a fourth has been recently discovered, but has not yet been opened up to any extent. As regards the Kurilla lode, the 15, 25, and 35 fm. levels have been brought up to within about 50 fms. of the eastern boundary of the property. The ore has held on well, and improved as each deeper level has been reached. Preparations are now being made to drive the 45 under the ore found in the three upper levels, and this will lay open a considerable body of good ore. The lode next in importance is Morphett's lode, about 26 fms. to the north of the Kurilla lode and parallel to it. A level has been driven along it at the depth of 10 fms. for about 100 fms., and excellent ore has been taken out throughout the whole of that distance, the value of which has more than paid the cost of the driving. So good are the prospects of this lode that Capt. Anthony, with the concurrence of the board and the colonial committee, has resolved to place upon it the engine which was sent out for the purpose of sinking Grainger's shaft (remembered a large body of ore was laid open in the bottom of that level, and which still remains there—a valuable piece of ground, to be worked and turned into money at the earliest possible opportunity. As a justification of Capt. Anthony in thus leaving for the early future the work which the engine was designed to do immediately, it may be mentioned that Morphett's lode is of an unusually good description; that it appears to promise more easily than Grainger's immediate returns, and that some of the samples of ore sent home from it contain as much as from 40 to 50 per cent. of copper. Anthony's lode, about 10 fms. to the south of Kurilla lode, offers good promise of being a good lode also, but the ore in body is expected to be found rather deeper here than 15 fms., at which depth a drive is now being carried along it. It is a parallel lode to the Kurilla lode, and can easily be drained and worked through a cross-cut from the one to the other. The ore raised since work was last resumed up to the date of the last advices has amounted to 661 tons, of a net value of about 6400*l*. This exhibits very good progress in ore getting, and it should be mentioned that the greater part of this ore has been got in the course of driving and sinking. Capt. Anthony holds out the confident expectation that when he has prepared the mine for more extensive stoping the monthly returns of ore will considerably increase. The average of the ores raised and sold has been about 18 per cent. of copper. The Duryea Mine, adjoining the Kurilla, is a property in which the directors feel a good deal of confidence, based upon information derived from Capt. Anthony and others respecting it; gold as well as sulphur and copper exist in the ore of this mine. It could be advantageously worked along with the Kurilla, or as a separate undertaking, if the necessary capital for doing so were forthcoming, but it is needless to say that the capital now in hand must be carefully husbanded for the Kurilla. The amount required to deal with the Duryea, however, would not be large, and the directors hope ere long to see the shareholders evince a desire to take the matter in hand and deal with this property. The Bon Accord property is a mineral property of still greater interest in some marked respects, being freehold, and adjoining the Burra Burra Mine. The latter is now being explored in depth, where regular lodes have been discovered, one of which at least runs directly towards the Bon Accord property, and is being sunk upon in depth at a point no great distance from its boundary. If, therefore, the operations at present in progress on these Burra lodes shall result in proving the existence of masses of ore of a permanent character, and if such ore-bearing lodes shall be proved to run into the Bon Accord, that property will become a very important asset of this company. At the Aberdeen Township, on the Bon Accord property, building to a considerable extent is going on, and having the terminus of the railway from Adelaide within it with the prospect of an extension of the railway system in that direction, and greater activity at the Burra Burra Mine, it is probable that population will increase and further advantageous sales of allotments from time to time be made. The directors are glad to think that the affairs of the company have progressed in so favourable a manner during the past year as to lead them to hope that the time is not far distant when the Kurilla property will have become a productive and paying mine, and enable the directors to deal practically with the subject of dividends. He begged to move that the report and accounts be received and adopted.—Mr. GEORGE SMITH seconded the resolution.

Mr. JAMES BROMFIELD said that he had long carefully watched the progress of the company and the course taken by the directors, respecting whom he would say that he entertained a very high opinion of the way in which they had managed the company and persevered through many difficulties. He thought the time had arrived when the Kurilla Mine was reaching a phase of profit producing. The monthly cost was now balanced by the monthly sales of ore. He fully expected that the sales would increase in quantity and quality, and he estimated that they would shortly reach 150 tons a month, which he calculated would leave a good margin of profit, out of which he thought the directors should then at once declare a dividend, or at all events commence to accumulate funds with that object, even if there should not at first be enough to pay the full dividend on the preference shares. He would rather receive a dividend than see the profits used in developing the mine rapidly into a large undertaking.

Mr. WENJAN asked whether the Devon Consols adjoined the company's Kurilla section, and whether it was not doing well?

Mr. MORRISON did not agree with Mr. Bromfield. He thought it would be a pity to strain after an early dividend with the risk of starving the mine. He would rather see it developed with all the means at command, and would be willing even to assist in adding to these if the directors, in whom he had thorough confidence, should consider such a step necessary. He hoped there might soon be occasion for calling half yearly meetings, but was content to leave that matter in the hands of the board.

The CHAIRMAN, in reply, stated that he was fully alive to the necessity of paying a dividend as soon as possible. Being a large shareholder, he had every motive for wishing to do so, but he must honestly say that he did not think the time had yet arrived when they could judiciously divert any money, time, or attention from the development of the Kurilla Mine. It had reached a most interesting stage, and he believed was on the point of being proved to be permanently productive, but he could not see his way, in the interests of the company, to fall in with Mr. Bromfield's suggestions at present. The Devon Consols adjoined this company's Kurilla Mine, and had turned out some very good ore, and he believed it was a promising property, but it was languishing for want of adequate means to work it. He would be happy to call a half-yearly meeting of the shareholders whenever there should seem to be a good reason for doing so, until when he thought an annual meeting, combined with monthly reports which were sent to the newspapers, would answer all practical purposes.

Mr. George Smith was re-elected a director, and Mr. W. B. C. Maxwell auditor.

A cordial vote of thanks to the Chairman, directors, and officers of the company was passed.

The services of Capt. Anthony were spoken of by the shareholders approvingly, and the directors were requested to convey to him the thanks of the meeting for the zeal and ability which he had displayed in the performance of his duties. The meeting then separated, after the usual acknowledgment by the Chairman.

Some very fine samples of ore recently received, taken from various points in the different lodes, were exhibited on the table.

CESENA SULPHUR COMPANY.

The annual general meeting of shareholders was held on Thursday at the offices, Finsbury-circus,

Mr. H. LABOUCHERE in the chair.

Mr. R. LARCHIN (the secretary) read the notice calling the meeting.

The manager's (Mr. F. Kossuth's) report states that the production for 1875 was 1,330 tons of black sulphur obtained from 77,566 tons of mineral drawn to the surface, showing on last year's production an increase of 25 per cent. The conditions of the fertile area in which the works are placed are such that this production is very nearly the maximum which this area can yield. However, the works are now far advanced towards a much wider fertile seam discovered in 1874, and there are good prospects of being able to strike it and utilise it before the end of 1876, and thus to acquire the means of raising the production at Borabella, while the general production will also be increased by the tribute which Bovilo and Polenta will yield beyond a doubt early in 1876. The cost of production was larger in 1875 than in the preceding year, the reason of which is thus explained. All through the year they met with upthrows and rolls in the seam, the effect of which was to increase the price they had to pay to the miners for a large portion of the mineral excavated. Instead of 3 frs. per metre cube, they had to pay for this reason 4 and often 5 frs., and this apparently small increase produces when reduced to the percentage of the tenure of the mineral, 5½ frs. and 11 frs. respectively per ton of sulphur. This increased cost was, however, each time provisional, and as soon as the difficulties were overcome the usual price was always enforced. Further, the wide barren plot encountered at the beginning of the year necessitated galleries 610 ft. collectively in length to get rapidly on the other side of it and to develope the facings speedily; whereas without these galleries the total production this year would have been very much below what it has been. The cost of excavating the same weighed so heavily on the cost of production that for the first three months of the year, while these difficulties were being overcome, the cost of our sulphur per ton had risen 10 frs. above its cost last year; but this large increment was gradually reduced in the final medium of the year. As there is no more capital to continue the works necessary for the development of the mines these works must be paid for with the produce of the mines, and must, therefore, gradually be drawn within the limits of the ordinary working expenses. Such has been the case this year with the Speranza and Eyboturione galleries and the works under shaft 4, which in former years were carried to capital account, while this year they were carried to production account. These galleries have to be driven on constantly as the works progress, and their cost produced an increase of 2 frs. 40 cents per ton in the cost of production of our sulphur.

The black sulphur cost the company, delivered at the railway station at Cesena, 98 frs. 45 centimes, while at Boratella if cost 75 frs. 17 centimes per ton; the refined sulphur cost 119 frs. 33 cents. at the railway station at Cesena, not including home office expenses, interest for the loan, and creation of a reserve fund for renewal of machinery. The medium selling prices in 1875 were for black sulphur, delivered at the railway station at Cesena, 141 lire 94 cents., equivalent to 5*l*. 5s. 6d.; for refined sulphur given as above, 167 lire 16 cents., equivalent to 6*l*. 0s. 11d. This year, therefore, they made larger profits on the sale of black than on refined sulphur; this would appear anomalous, because the difference between the selling price of black and refined sulphur is considerably larger than the normal expense for refining, and hence they ought to make larger profits by selling refined than by selling black; this anomaly is explained by the fact that, unfortunately, they have no refinery, except a small one at the mine, which is very unfortunately situated, and badly constructed, so that refining at this small refinery costs the company even more than per contract. Now they pay high profits to the contractor of refinery in force of an old contract, which, however, will soon expire. These high profits explain the anomaly stated above, and although they are conscious of this fact they will be forced to renew this onerous contract, unless they decide upon spending a portion of the profits in 1876 on building a refinery.

Without wishing to state ciphers, which in mining are always uncertain, Mr. Kossuth may express his conviction that in 1876 they will be able to keep up the constant increase of the production; although in the beginning of the year they will have to contend with several upthrows, and a portion of the barren plot which was met with in 1875, and these circumstances will again rather interfere with them both in weighing down the amount of extraction and in impoverishing the mineral. There are several symptoms in the seam at Boratella which are probable forerunners of some important change which may (and they have good reasons to believe will) largely repay them for the loss occasioned by the said upthrows and barren plots. Boratella alone will, probably, yield in 1876 a greater production than in 1875; and their total production will be further increased by Polenta and Borello, the first of which will be producing mineral before the next general meeting. Further, the costs of production and transports will he believes, show an appreciable diminution in 1876, several works which weighed on these costs in 1875 having now to yield their effects; and hence he trusts their conditions will be considerably bettered in 1876.

The CHAIRMAN said the shareholders knew pretty well as much as the directors about the mines. They knew that the mines were there, and they knew also that shortly after the floating of the company the mines fell in, and they had to make new workings to get out the sulphur. The first two or three years were unfortunate years, and he did not know they could say that they had very good managers, but at last they met with Mr. Kossuth, and now the mine, with all its details, was managed by Mr. Kossuth, and he did not believe they could get a better manager. The great point of the directors was to reduce the expenses of getting out the sulphur and sell it at the best price. The objectionable feature was that there was no dividend. When Mr. Kossuth was over here a short time since the directors had a long discussion with him, and it was found desirable to erect refinery works for the purpose of reducing the cost of production. These works would be erected in the present year, and after that the shareholders would possess one of the best mines in Italy, and Mr. Kossuth believed that after that the shareholders might fairly expect a dividend. Owing to the importation of Sicilian sulphur the price of sulphur had somewhat fallen, but as the company's mines were on the spot, and as sulphur was largely used in the district for vines, there was no doubt whatever that there would always be a ready sale for the sulphur at good prices, and it was improbable that the present low prices would always continue. He explained that the present meeting had been somewhat delayed owing to the difficulty of getting the accounts made up. In conclusion, he moved the adoption of the report and accounts.

Mr. EDENSOR said that personally he had every confidence in Mr. Kossuth's honour and integrity as far as knowledge of the mine was concerned. He thought, however, that some investigation ought to be made into the circumstances under which the company was floated, and he proposed that the meeting be postponed, and that the Chairman and shareholders should form themselves into a committee to investigate into the floating of the mine, and call upon Messrs. Stainforth and Scheyer to reimburse the present shareholders the amount of their original shares. He thought there was a great similarity between the floating of this company and the notorious Emma Mine.

The CHAIRMAN said the circumstances seemed to him to be entirely different. In the first year of the existence of the Emma there were 18 per cent. dividends paid quarterly, and the presumption was that in future years even larger dividends would be paid; but in the Cesena Company the shareholders could not complain of having ever received a dividend or been led to believe that still larger dividends would be paid. He firmly believed the company possessed a good property, and he also believed Mr. Kossuth was a highly honourable and an excessively intelligent man; he was also certainly a very plucky man, because a short time since, when it was necessary to fire a charge of gunpowder, and when the workmen were reluctant to do it, Mr. Kossuth himself, accompanied by five workmen, went down the mine and fired the charge, and when he was over here all the skin was off his face. He might also mention that two of the men were killed, and the others were seriously injured.

Mr. BONSER said that, as a matter of form, he would second the resolution of Mr. Edensor.

The CHAIRMAN, in answer to an observation, said that the great portion of the shareholders resided in France and Italy. He pointed out that, notwithstanding the expenses of the galleries, the company made a profit last year, and he hoped that, notwitstanding the cost of the refineries, this year there would also be a profit.

A SHAREHOLDER said it was best to look at the present position of the mine, and not go into old matters which were passed and gone. He hoped the directors would turn their attention to the best means of working the mine with the view of getting returns for the shareholders.

The CHAIRMAN, in answer to a shareholder, said the cost of the refineries would be under 8000*l*.

Mr. Edensor's resolution was then put and lost. The resolution of the Chairman was then put and carried. The retiring directors and auditors were reappointed, and the meeting broke up, with a vote of thanks to the Chairman.

CENTRAL FOXDALE MINING COMPANY.

The ordinary general meeting of shareholders was held at the office of the company, Seel-street, Liverpool, on Tuesday,

Mr. THOMAS GERARD in the chair.

Mr. THOS. HUGHES (the secretary) read the notice convening the meeting, and the minutes of the preceding one having been read and confirmed, the statement of accounts to March 27, showing a balance of disbursements over receipts of 4417*l*. 17s. 6d., and of liabilities over assets of 202*l*. 16s. 7d., were submitted, together with the reports of the directors and of Capt. Julian, of which the subjoined are abstracts:—

The directors can with satisfaction point to the very encouraging prospects under which this mine has been brought into full working order, with all the machinery and appliances necessary for a thorough development. Moreover, there remains at the present time a large balance in favour of the company, consisting of 17,493*l*., capital at call; 2507 unallotted shares; and ore in stock and cash in bank, 527*l*. At the meeting held on May 27, 1875, Capt. Bawden recommended certain work to be done, and no time has been lost in carrying those recommendations with effect. The directors feel confident that it is the best policy to place as many men as can fairly earn wages to open up the mine, since the dead expenses at surface, such as engine-work, coal, engineers, and captain and pitman's wages, have to go on all the same, whether 20 or 100 miners are employed. At the same time the greatest economy, with due regard to efficiency is observed in working. A good discovery of lead ore has recently been made in the 60 east, going towards Taylor's shaft, worth 1½ ton per fathom, and is improving. This lode is in virgin ground, and is expected to lead to a large deposit of ore, as large quantities of lead have been found in Taylor's by the previous owners in the same run of ground 15 fms. nearer to surface. The sales of ore have not realised expectations. They have sold only 20 tons, and sampled for the second sale 25 tons. This is in a great measure owing to their not being able as yet to open up sufficient ground for additional stopes, but they expect in a short time to be able greatly to increase the stoping ground. The plant and machinery, dressing-floors, &c., are in excellent working order, and it only requires a little more time and perseverance to open out the ore ground already discovered, in order to make profitable returns.

Capt. Thomas Julian (Mold, May 16) refers in detail to the various points of operation, and then remarks that after a due consideration of all the circumstances connected with the mine, he believes they have a really valuable property, especially in the east and west sections, which only requires a spirited development to make it profitable, and to that end he has carefully thought over the matter of further development, and, as they have every appliance necessary fixed for the draining of every section of the mine, then capital need only be applied to the extension of the levels and the necessary sinkings. His recommendations are—At Watson's: Sink the shaft to (say) the 102 fm. level, cross cut, and open out on the lodes at that point. Drive the 90 east and west. Drive the 75 and 60 east with all speed, and as soon as possible communicate one of the levels with Taylor's, so that the water from Taylor's might come direct to Watson's, thus dispensing with the horizontal rods at surface.—At Taylor's: Drive the 40 east on the north branch seen in the cross cut a few fathoms from end of cross cut, as I believe that it will prove to be the main lode this cross cut was designed to find. Drive east on the south lode at the 55, and about 20 fms. from shaft in this level put up a rise through the lode to the 30, where you are likely to be in the run of ore ground so productive in the upper levels. Continue the sinking of the shaft for a 12 fm. level below the 55, and, if not prevented by water, sink a sump winze on the south lode, or continue the one now sunk about 2 fms. below the 55.—At Amy's: Suspend the north crosscut at the 40 until the lode be found at surface, and its correct underlie be ascertained, clear out and drive the 40 on the south lode east and west, also drive east and west on the large lode about 6 fms. north from the shaft: and from the fact of there being good runs of ore found in the 30 and other levels above, he is sanguine they will find their continuation at this, the 40 fm., level.

The CHAIRMAN said that the directors' report, which had just been read, together with Capt. Julian's report, entered so fully into particulars that he felt it was hardly necessary for him to add anything further. With respect to Capt. Julian's special report, which had been made independently of the report from the resident agent, Capt. Bawden, he (the Chairman) was glad that the directors were able to place so favourable a report before the shareholders. He was on the mine last month, accompanied by a friend of his, who held a large interest in the company, and had great experience in mining. This gentleman went underground through the various workings, and was perfectly satisfied with the prospects, and he could fully confirm the captain's report as to the discovery made in the 60 east, worth 1½ ton to the fathom. He (the Chairman) was happy to inform them that the weekly report just received from their agent states that the 60 east improves, and was now worth 2 tons of lead ore to the fathom. He would now beg to move that the accounts and balance-sheets, together with the reports, be received and passed.

Mr. HADFIELD said there was one item in the balance-sheet which he did not understand—the 600*l*. outstanding liabilities for wages, &c., and he wished to know if this was a debt owing at the date of the balance sheet?—Mr. HUGHES explained that the amount referred to was not due and payable until April 28, and was only inserted as an estimate of the following month's costs, which would, of course, appear in the next balance-sheet.

Mr. IRVINE remarked that the item had been entered in the balance-sheet simply as a memorandum.—Mr. HADFIELD replied that it should not have appeared in the balance-sheet, and it ought to be struck out.

It was moved by Mr. S. S. LLOYD, seconded by Mr. HADFIELD, and carried unanimously, that the statement of accounts and balance-sheet as presented be approved and passed, with the exception of the item 600*l*. outstanding liabilities, which item the auditors be requested to strike out.

Mr. C. WELLS proposed that the directors' report, as presented, be received and adopted, which was seconded by Mr. J. HOLT, and carried unanimously.

Mr. HADFIELD said he was glad to find from the report just read that the directors had as much confidence in the mine as ever.—Mr. WELLS wished to know if the discovery of ore in the 60 east held out, and if they found the lead in any quantity?

Mr. HUGHES said in reply that he was happy to be able to state that the course of ore discovered in the 60 east continued to hold out well, and it was reported to be now worth 2 tons per fathom. As this discovery was in new ground it augured well for the deeper levels—the 75 and 90 going east, as shown on the plan now before them. In a month or two they would be deep enough to cross cut at the 105, where they expect to find the north and south lodes rich for ore. As this portion of the mine was fully described in the report, he need not remark further upon it, but would point out on the plan the position of the workings referred to by Capt. Julian, and the situation of the ends from which they were now raising ore. Although they had sampled only 25 tons of clean ore, taken from the ends in the 75 and 90 east, they had now on surface from these ends, and also from the 60 east, a pile of some 30 tons of orestuff, which would return at least one-half in clean marketable ore. This was not much, but they must remember that almost all the wealthy mines had made but small returns at first, and that large sums of money had been expended on them before they had been brought into anything like the effective state that their mine was in at the present moment. He had every confidence that before the next meeting he would be in a position to report much better results.

After sundry discussions as to the various points of operations, state of the machinery, dressing-floors, &c., it was proposed by Mr. S. S. LLOYD, seconded by Mr. HADFIELD, that Lieut-Col. H. B. Chalmers be re-appointed a director for the ensuing year—carried unanimously. Messrs. Wenham, Brothers, and Agar, were re-appointed auditors for the ensuing year.

A vote of thanks to the Chairman terminated the proceedings.

SOUTH CONDURROW MINING COMPANY.

A meeting of shareholders was held on Wednesday, at the offices of the company, Austinfriars,—Mr. H. J. MARSHALL in the chair.

Mr. JAMES HICKEY (the secretary) read the financial statement, which showed a balance in favour of the mine of 1337*l*. 9s. 7d.

The CHAIRMAN said there were one or two features in the accounts which, no doubt, the shareholders would have noticed. First there was a decrease of the liabilities. In the last accounts they were much heavier than now; 1722*l*. was owing to merchants as compared with 587*l*. odd at the present meeting. In paying up the merchants they had gained an amount of 38*l*. 5s. 3d. in the shape of discount, and they had now a balance to deal with of 1337*l*. 9s. 7d., showing a profit on 16 weeks' working of 1233*l*. 2s. 2d., and, looking at the present price of tin, he thought they would agree that was a very good profit indeed. Everybody seemed to think that tin had reached its lowest price, and he could only hope such was the case. Australia could not compete with them at the present price. Straits tin was very much in the same position as Australian, and the smelters were ready to take all they could produce at the present price.

Capt. RICH then read his report, which was as follows:—

June 6.—The boundary shaft in the new western ground is sunk 22 fms.: it has been recently cased and divided to bottom, and footway fixed. The sinking will now be urged on below the 22 without delay; the lode at the deepest point is 2 ft. wide, carrying a little tin. There is a cap of slate-rock overlying the granite in the western part of the property. As soon as we have sunk through the slate and into the granite we think the lode will open out profitably productive. We have a set of men driving the adit, east of engine shaft, with the view to open a communication between it and Williams's shaft; we hope to accomplish this in a week or two: this is being done to take up a large stream of water that is now going into the mine. We have commenced to sink the new shaft below the 30, on Fraser's lode; the lode in the bottom is worth 6*l*. per fathom. A rise in the back of the 50 east, going towards the shaft referred to, is worth 7*l*. per fathom. The 50 end, west of cross course, on the great lode, is worth 12*l*. per fathom. A winze in the bottom of the 50 east is worth 8*l*. per fathom. We are sinking a winze in the 60 west, on West Basset lode, to ventilate the 70; the sink is being made by the side of the lode, which will be cut through as soon as a communication is made. Some time ago we put out a cross cut north of the West Basset lode in the 60, and intersected the great lode. In the drivage east of the cross-cut referred to the lode is worth 8*l*. per fathom, but in the 60 end west the lode is worth 20*l*. per fm. There is no drivage over the 60 west; the lode is, therefore, standing whole to surface, probably over 100 fms. when measured on the stope or underlie of the lode. The 70 end west is worth 7*l*. per fathom. The 82 west is worth 8*l*. per fathom. We have intersected the cross-course in the 82 east, and have begun to sink a winze in the bottom of the level to prove the lode and for ventilation. The lode in this winze is worth 12*l*. per fathom. No. 2 winze, in the bottom of the 82 west, is worth 10*l*. per fathom. The 93 end east is worth 8*l*. per fathom. The 93 west is worth 10*l*. per fathom. The rise in the back of the 93, to meet the winze already mention as near the cross-course, is worth 12*l*. per fathom. We have set new stopes in the back of the 23, which are yielding moderate quality tinstone. We are also opening up good tin ground in the 50 east near the cross-course, as well as in the 60 west. The mine, on the whole, is opening out well, especially in the shallow levels and in the 93 west. We have sold during the past 16 weeks 155½ tons of tin. If the price for tin had been the same as it was two or three years ago the mine would have given corresponding greater profits.—WILLIAM RICH, WILLIAM WILLIAMS, HENRY ABRAHAM.

Capt. RICH then went on to say there were now 15 or 16 ends working in the mine. Tin was sold last Saturday, and the committee had included in the accounts the costs which were due next Saturday. Hence the mine was in a capital financial position. They had made some 1200*l*. or 1300*l*. profit, notwithstanding the fact that tin had dropped 12*l*. per ton since he had taken charge of the mine.

The CHAIRMAN then formally moved the adoption of the report.

In the course of a discussion which ensued,

The CHAIRMAN said that the auditors, Messrs. Deloitte, Dever, and Co. (Mr. Dever being present), objected to sign the accounts without a certificate declaring that the assets in hand were more than the value of the costs incurred after June 3.

After some discussion the certificate was signed by Capt. Rich, in accordance with Mr. Dever's wishes.—The report was then adopted.

The CHAIRMAN proposed a dividend of 3s. 6d. per share, absorbing 1071*l*. 10s. 6d., and leaving a balance of 266*l*. to be carried forward.—General CLARKE seconded the resolution, which was put and carried.

General CLARKE then proposed that the present committee be re-elected, and expressed his perfect satisfaction with what was going on. The resolution was seconded and carried.

On the motion of General CLARKE a vote of thanks was passed to the Chairman, and the meeting closed.

WICKLOW COPPER MINING COMPANY.

An adjourned general meeting of shareholders was held at the offices, Grafton-street, Dublin, on June 2, for the purpose of appointing a new board of directors in the place of those who were to retire. The Chairman of the former board, Mr. R. W. KELLY, presided. After stating the object of the meeting, he mentioned the dissatisfaction which prevailed as to the working of the mine, which caused the body of directors now to resign, and let the shareholders appoint others more to their taste. He fully agreed in the motion, and felt that whenever directors had from any cause lost the confidence of the shareholders their position was not only useless but onerous and disgraceful. They, therefore, resigned. The directors about to retire had now been in charge of the property for about three years. At the time at which he became Chairman the concern was in a very critical state. The chemical works were being carried on, a large amount of money had been lost on them, and had they been allowed to continue they would have swamped the company. The first step taken was to stop these works. They had also a Chancery suit going on against them then which proved exceedingly troublesome, but they had succeeded in compromising the suit, and in clearing off all liabilities connected with it. The first time he appeared there as their Chairman he told them candidly that as far as he could see the result of the winding-up of all the affairs of the company would be that after clearing off their liabilities there would be left a working capital of about 2000*l*. To-day the directors were prepared to hand over the concern, cleared of all liabilities except 5500*l*. worth of bonds that were outstanding, and that would not be payable till October: but in retiring they left ample funds in hand to discharge those liabilities; so that taking the stock in hand, and other available assets, they had a working capital of about 2300*l*. (Hear.) Beyond these bonds for 5000*l*., 200*l*. would cover all their liabilities, and, on the whole, they were handing over the concern to their successors in a better condition than it had been in for years. All their plant and their mine was in first-class order, and was capable of turning out larger quantities of iron ore and silver than ever before, but unfortunately there was now no market for these materials, but the directors in retiring would leave to their successors contracts at what might be called high prices, and which would enable them to keep on the mine without loss for 12 months to come, and if the depressed markets improved, the directors left to their successors the property in such a state as to give them an opportunity of doing better than they had been able to do. But to manage the affairs of the company required a great deal of knowledge of the materials they had to deal with, and a great deal of personal labour and trouble, and it was through this that they were able to present this record of their management. He had no doubt that had the management been placed in the hands of men with as much will to do as well as they had done, but with less knowledge of the markets of the company, would not to-day be in so good a position. He should now vacate the chair, and they could appoint a Chairman to carry on the business of the meeting.—Mr. Kelly then left the chair.—Mr. WALSH, before Mr. Kelly left the chair, asked whether a balance-sheet had been struck to May 31 instead of a mere statement?—Mr. KELLY replied that in every statement he had ever made to the shareholders he had always made it firmly believing that the statement was strictly true. Mr. Walsh, if he were among the new directors, would, although there was no balance-sheet to May 31, find that to ascertain the state of the affairs of the company was a very simple matter. The liabilities were simply *nil*, except those mentioned.

Mr. WILLIAM ROPER was then called to the chair; and on the motion of Mr. CUMMINS, it was resolved that a new directorate (of six) should be elected.

On the motion of Mr. BUCHANAN, seconded by Mr. BURNSIDE, the following

gentlemen were elected to form the new board of directors:—Messrs. Thomas Davis, Cairnhill, Stillorgan; John Walsh, Dundrum; Edward Breslin, Bray; George Tickell, J.P., Clontarf; Laurence Smith, St. Andrew-street; and Charles Cummins, Ballybrack. The moment the Chairman declared the new directors elected, Mr. Brabazon proposed Mr. Hughes, who however, declined to have anything to say to the matter. Dr. STUDDERT suggested going through the names of these six gentlemen *seriatim*.——The CHAIRMAN said the election was over.

Mr. WALSH, as one of those proposed, said he was sure it was not their wish to go on the board without the full approbation of the majority of the shareholders. He thought, perhaps, that gentlemen would see that it was not with a desire to override them, but to save their time that the course which had been taken had been adopted. Mr. Hughes had declined.——Mr. CONNELL said there were the names of some gentlemen on the list whom he would as soon ask to make a watch as to manage a mine.——Several of the new directors offered to resign, and the question was then put again, and carried unanimously.

Mr. CUMMINS then moved, and Mr. Walsh seconded, a resolution to the effect that the directors should not receive any remuneration so long as the shareholders are receiving no dividend. The resolution was adopted. After a vote of thanks to Mr. Roper, a vote of thanks was passed to Mr. Cummins, and the proceedings terminated.

EAST CHIVERTON MINING COMPANY.

A meeting was held at the offices of the company, Gresham Buildings, Basinghall-street, on Wednesday,

Mr. RICHARDSON in the chair.

The SECRETARY (Mr. Granville Sharp) read the notice calling the meeting, and said it was called to re-pass the same accounts as those he submitted to the meeting on Aug. 12 last, and to make a call to the same extent as was made on that occasion. A circumstance had transpired very recently in which a shareholder objected to pay a call made upon him, in common with his fellow-shareholders, in another mine, because only seven days' notice, including the day of postal, had been given, instead of seven clear days, as required by the new Act, and as the same party was a shareholder in East Chiverton, and in arrears of calls to a very considerable amount, he (Mr. Sharp) thought it not unlikely the same objection would be made, therefore, to avoid any chance of a repetition, this meeting had been called.

The accounts, as submitted in August last, were re-read and passed, and a call of 5s. per share was made. The resolutions and a vote of thanks to the Chairman were carried unanimously. The number of shares represented were 1954.

The meeting then separated.

WEST WHEAL SETON MINING COMPANY.

A four monthly meeting of adventurers was held on Thursday at the mine, Mr. T. PRYOR, the purser, presiding.

The statement of accounts showed that the labour costs for the month of January amounted to 1318*l.* 2s. 3d.; February, 1196*l.* 0s. 3d.; March, 1342*l.* 17s. 6d.; and April, 1208*l.* 1s. 3d.: total, 5065*l.* 1s. 3d. The merchants' bills were 2570*l.* 18s. 10d.; parish rates, 47*l.* 3s. 1d.; and dues, 487*l.* 6s. 9d. The receipts were, for copper ore, 6810*l.* 10s. 5d.; for tin, 1778*l.* 7s. 1d.; and for arsenic, 178*l.* 12s. 1d. The total receipts amounted to 8777*l.* 15s. 10d., and a profit was made on the four months' working of 807*l.* 5s. 11d. The balance now against the mine is 4580*l.* 19s. 6d., as compared with 3899*l.* 3s. 11d. at the meeting in February; but the existing deficit includes 1901*l.* 10s. paid in respect of 109 relinquished shares.

Cap. Josiah Thomas in his report stated, amongst other things, that they had commenced to sink a winze below the 140, about 10 fms. below the 150 end, where the lode is worth for 9 ft. long 90*l.* per fathom. The other productive points in the mine are the 140, west of Michell's shaft, where the lode is worth for tin and copper 25*l.* per fathom; the 130 west, which on the south part of the lode is worth for tin and copper 10*l.* per fathom; the lode in the winze under the 130 on the north part worth 15*l.* per fathom; and the north lode below the 130, east of Michell's shaft, 25*l.* per fathom.

On the motion of Mr. F. HARVEY, seconded by Mr. P. P. SMITH, the accounts and report were passed.

The PURSER, referring to the payment of 1901*l.* 10s. which had been paid to the relinquished shareholders, said that sum had been arrived at after a great deal of consideration on the part of the committee, and fixed on the basis of the official valuation that had been made. They were perfectly satisfied that the proportion was a fair one, but during the last day or two Mr. Mayne, one of the relinquished shareholders, had served him with a County Court summons for a sum of 27*l.* 18. 6d. over and above the 244*l.* which had already been paid to him. Mr. Mayne seemed to have forgotten that there were certain costs to be deducted from the valuation, for which he had made no allowance. He (the purser) asked the adventurers to give him authority to defend the action.

Mr. W. H. RULE, in proposing that the necessary authority be given to the purser, complained that the valuation was a very excessive one, and that the relinquished shareholders were, therefore, already more than sufficiently paid. He spoke very hopefully of the future prospects of West Seton, and believed that in the coming four months a profit of at least 2000*l.* would be shown.——Mr. LOAM seconded the motion, and said he quite agreed with Mr. Rule that the valuation was an excessive one.

Mr. P. P. SMITH appealed to Mr. Mayne to withdraw the summons after the explanation which the purser had given, but this Mr. Mayne re used to do.

Mr. RULE said the fact was that Mr. Mayne was acting for Capt. Teague, and, therefore, was not a free agent in the matter.——Mr. MAYNE replied that Mr. Rule was taking too much upon himself in making such a remark. He should like to know who Mr. Rule was acting for?—Mr. RULE: I am acting for my family, and do not want to see them robbed.——The resolution was then carried unanimously.

The PURSER mentioned that the New Seton lease had been handed over to the adventurers by Mr. Basset free of expense, and that it would continue in force during the same period as the West Seton lease.

Mr. MCDERMOTT applied for leave to erect the Frue Vanner on the mine, offering to do so at his own expense. He stated that it had already been tried at New Consols, but the conditions there were not favourable, nor the facilities sufficient to properly test the value of the invention.——The application was granted, and the meeting separated.

SOUTH CARN BREA.—A three-monthly meeting of adventurers was held at the mine on June 2, when Mr. Walter Pike, the purser, said the adventurers would see from the accounts that unfortunately they had this time made a loss. Something like 800*l.* on the three months, and this added to the balance against them at the last meeting, made a total deficit of just over 1100*l.* on the six months' working. Last time they did not make any call. They would see by the report that the state of the mine at present was only speculative; their great hopes lay in the 164 fm. level going west. As Capt. Rich had remarked in the report, 60 fathoms ahead of this was a cross-course which in the parallel mine of North Basset made such an enormously rich course of ore, and he thought they had every reason to hope that as they neared that cross-course they would meet with something good. They would remember that the bunch of ore which they had in the 130 east made against a cross-course, and there was no doubt that in that district it was the cross-course that made the ore. He moved the adoption of the report and accounts, and also that a call of 4s. per share, equal to 1000*l.*, be made. This was seconded by Mr. Hawke, and carried unanimously, and the meeting separated.

[For remainder of Meetings see to-day's Journal.]

PATENT EQUILIBRIUM VALVE.—At the recent meeting of the North of England Institute of Mining Engineers an ingenious form of equilibrium slide valve, the invention of Messrs. Chambers and Jones, of Cawthorne, near Barnsley, was exhibited, and attracted much attention. The whole of the steam is excluded from the back or top of the valve, as the case may be, so that the smallest amount of friction is secured, and, no matter how high the pressure of steam, the valve is moved with as perfect ease as with a low pressure or no pressure at all. The exclusion of steam from the top or back of the valve is secured by making a faced steam chest cover, against which the valve works, as it does against the ports of the cylinder. This top valve is kept tight and secure by means of a spiral or common spring, which is set up by one or more set screws, which are easily adjusted through an aperture left in the steam chest cover. By this means, also, the valve can be constantly seen at work, and kept in efficient working order. The equilibrium of the valve is secured by having the top part of the valve of equal dimensions and area to the bottom part, which immediately overlies the ports of the cylinder, so that an equal pressure is exerted by the steam when admitted to keep the valve off the face of the ports as is exerted to keep it to them. If necessary, this area of the top part may be enlarged to have the greatest amount of pressure, so taking off all friction whatsoever. Wherever the valve has been applied it has given great satisfaction, and one colliery proprietor writes that he has had the valves at work on a pair of coupled 20-in. cylinders for 18 months; before using them the engine drivers had great difficulty in reversing the engines, but since applying the valve this is reversed, and the engines work much easier with steam on than off, and lift the same weight in a less time and with a less pressure of steam.

DARTMOOR UNITED CHINA-CLAY WORKS.

In the present condition of the tin and iron trades it is not unreasonable that preference should be given to properties which produce minerals for which there is a ready market at the present moment, although the advantage of having tin and iron in reserve is, of course, considerable. It is a property of this description that it is proposed to work by the DARTMOOR UNITED CHINA-CLAY WORKS, which has just been formed, with a capital of 40,000*l.*, in shares of 10*l.* each, of which three-fourths is to be at once issued; it comprises three valuable leaseholds on Dartmoor, held from Sir Massey Lopes, Bart., upon reasonable terms—the Princetown china and fire clay and tin sett, the Leedon china-clay sett, and the Yannadon iron sett—but the prospectus mentions that until the tin and iron markets improve the china-clay and fire-clay will alone he worked.

The china-clay is almost inexhaustible in quantity and of excellent quality, adapted to the manufacture of china ware, and also for paper making and bleaching, for all which purposes there is a large demand, so that sales may be readily effected. The fire-bricks producible from the clay in the Princetown sett will find a good local market. The setts contain an abundant supply of water, which is essential both in the working of china clay and in the stamping and dressing of tin, and as the Dartmoor tramway is within a convenient distance of the works, and places them in direct communication with Plymouth wharves, the means of transit are excellent.

The principal tin deposit is in Princetown, which sett contains valuable and promising lodes and a large deposit of halvans left by the ancients, which with modern appliances will yield profits when stamped. Tin is also found disseminated through the clay in paying quantities. The Yannadon sett produces brown mangniferous hematite, averaging about 50 per cent. of metallic iron, and containing mere traces of sulphur and phosphorus. The sett also contains lodes of manganese and a deposit of ochre. The properties have been inspected and reported upon by Messrs. J. H. Collins, F.G.S., and T. W. Rumble, C.E., their opinions upon the prospects of the properties being very favourable. Mr. Collins states that the works at Princetown consist of several small pits and shallow workings on the tin lodes; a shallow adit, driven some 70 fathoms into the hill, and a cross cut of about 25 fathoms, both of which are partly driven into the clay; and a deep adit, which is being cleared and extended, but has not yet reached the clay ground. This latter will take several months to complete, and when completed it will open up the clay to a depth of about 12 fathoms.

Of the tin workings, Mr. Collins says that there are fair indications of good deposits; some of the lode-stuff is of very good quality, and one branch which passes through the clay, pierced by the shallow cross-cut, is in places very rich. Without recommending the immediate working of these deposits, *per se*, he observes that you are likely in working the clay to get tin in quantity sufficient to warrant the erection of a small battery of stamps. These stamps may be worked by a water-wheel, for which there may be obtained ample water power. The situation of the clay bed, the elevated position of the stream of water, and the general "lie" of the ground are all favourable for working. The plan proposed—to wash the clay over the stope, to separate the mica in the usual manner near the mouth of the adit, and then to run the refined clay down to the lower part of the sett by the side of the tramway in open launders—is quite proper, and calculated to work the property at the least possible expense.

At Leedon, there is a large extent of what seemed to Mr. Collins to be clay ground, but he was not able to make so satisfactory an examination as he wished; but in another report which he made three months later he stated that the Leedon property had been well tested by a very large number of pits; in all of these the overburden was very shallow, and the clay very white for top clay. Mr. Rumble says that at Princetown, a great deal of work has been done, proving the china-clay which, in his opinion, is of very good quality, and will turn out to be more productive than at Leedon. He recommends that they should take off the overburden, complete main adit, and sink shaft at the end thereof for working the clay. He suggests that they should commence to make bricks, and put up a kiln for burning them. He thinks it would be better to leave the pits and launders, and such work, till the works at Leedon are complete and in working order. At Leedon he would extend the adit 20 or 30 fms., and a shaft should be sunk through at the extremity for working the clay, the overburden be taken off, and proper drains and trenches put around the surface to prevent the water from going into the clay. Lay down the launders, make pits, erect buildings, tanks, &c. There should also be some cottages provided for workmen, and he thinks you would require an expenditure of 4000*l.*

He recommends that, owing to the present state of the iron trade, little should be done at the Yannadon iron sett at present. An expenditure of some 20*l.* per month over and above the rental, judiciously laid out, would be sufficient until the china-clay and brickworks were got into working order, or the iron trade improved. He cannot but look upon the properties in question other than as an excellent venture worthy of careful development, with every prospect of a good return; it time they may be very greatly extended. It is estimated that upon a capital of 50,000*l.* a profit of 20 per cent. per annum will be realised, so that the attractive character of the enterprise is beyond question.

THE CHANNEL TUNNEL.

A Boulgne letter gives some interesting details of the operations which are being carried on preliminary to the sinking of driftways for the Channel Tunnel. The writer says:—

As soon as the concession was voted operations commenced in earnest, the interval having been occupied in completing details. From the second week in August to the end of September the Pearl, with her staff of engineers, went out when the weather permitted. M. Larousse, the hydrographier, used to take the steamer to her station for commencing soundings, and ascertained her position by cross bearings; this being done, Messrs. Potier and De Lapparent, jointly or singly, took an exact register of the depth and time of each sounding, and examined each specimen brought from the bottom, which was put into a specially prepared bottle with a registered number. These specimens were sent to Paris, where they were subjected to a more minute examination, and classified. M. Larousse took bearings every five or ten minutes to ascertain the steamer's exact position, such continual observation being necessary owing to the ever-varying currents. On days when rough weather would not allow of accurate soundings, or thick weather hid the coast, Messrs. Potier and De Lapparent used to examine the cliffs. During the six weeks' operations 1522 soundings and 753 specimens of the bottom were obtained; 335 of them have been classified with certainty. The average daily castings of the lead were 70. The boundary line of chalky stratum has been ascertained by the lead bringing up either sandston or clay, which form the strata on either side of the chalk, and this over a distance of 28 kilometres from the French coast, at which point English waters begin, and the consent of the English Government, in this case a mere formality, was necessary previous to making surveys, which permission has been lately granted. Last autumn's observations and soundings have settled two points—firstly, that no break exists in that portion of the layer of chalk, gault, and *craie de Rouen* which comes to the surface on the bottom of the Channel in the parts where soundings were taken; and secondly, that the dip observed in some of the strata no where exceeds 10 per cent. This year's soundings will probably be undertaken from Dover, as being closer to the scene of operation. The belt of soundings, which is from one to five miles broad, has been made from two to four miles west of the line where the tunnel is intended to be made. For the information of non-geologists it may be explained that the soundings have been made over that part of the Channel where the chalk crops up, and the distance of two to four miles further east is to allow the stratum to dip sufficiently to allow of there bing a good thickness between the crown of the tunnel and the bottom of the Channel.

The programme for this year's campaign is—1. A series of soundings very close together in English waters to settle a doubt as to whether a divergence of the chalk towards the north is due to a break or is only a dip.—2. A series of soundings over the projected line of tunnel to ascertain whether the stratum called by the geologist Phillips "chalk with numerous flints," and which overlays the stratum through which the tunnel is to be cut, comes to the surface.—3. A series of soundings over the space between those made over the bed of chalk last year and those taken over the line of tunnel.—4. Soundings over any spaces not already examined.—5. Boring on shore in the immediate neighbourhood of Sangatte, which shall be sunk at least 10 metres beneath the gault. When those works have been accomplished a well will be sunk and a heading driven under the Channel. Sir John Hawkshaw's searches are against the existence of interruption of the strata, and confirm the general opinion of geologists that no important flaw exists.

Over that portion of the Channel sounded last year it has been found that the shore slopes regularly and gradually towards mid Channel, where there is a mean of from 50 to 60 metres, whence there is a gradual ascent to the English shore; the greatest depth is in a few hollows on a line from Blanc Nez to Folkestone, where the soundings give 60 to 65 metres; preliminary soundings taken 200 to 300 metres apart over the projected line of tunnel nowhere exceed 54 metres.

Before describing the boring at Sangatte it may be borne in mind that two previous series of experiments are on record. The first was the attempt made to supply Calais with water by means of an artesian well, in 1845-8; it reached a depth of 1200 ft., when the rods broke in the green sand, and could not be extracted. The only point to the present purpose is that throughout the chalk only spring water was met with, and nowhere in sufficient quantity to rise to the level of Calais market place.

The second set of experiments was undertaken by Sir John Hawkshaw, who selected for his Channel Tunnel borings a spot intermediate between Calais and Sangatte, upon La Ferme Mouron, close to Les Barraques. Its chief results tally with the observations taken by Messrs. Mulot Père et Fils at Calais, the strata only increasing in thickness westward. The daily progress of the borings through the upper strata averaged from 50 to 60 centimetres, since reaching the grey chalk (*craie de Rouen*) the rate has increased from 82 to 106 centimetres daily; the greatest progress made in any single day was 2 metres 50 centimetres in 22 hours. Now that a softer stratum has been reached progress will be more rapid, and next week faster, though less powerful, machinery will be substituted for that now used.

A convention has been signed by the following gentlemen, who have been appointed commissioners to settle all international questions arising out of the construction of the Channel Tunnel:—MM. Gavard, Kleitz, and Laparent on behalf of France, and Messrs. Kennedy, H. Watson, and Capt. Tyler on behalf of England. It is difficult to enumerate all the duties which will come under their notice; but, apart from matters pertaining to the construction of the tunnel, some of their functions will not be unlike those which have to be undertaken by commissioners who are usually appointed in the settlement of questions of boundary and frontier.

ELECTRO-MAGNETIC ENGINES.—Messrs. BROWN and Co., of Southampton-buildings, Holborn (for Daniel F. Kimball, of New York), has patented some improvements in electro-magnetic engines and galvanic battery to be used therewith, the said battery being also applicable for other purposes. The features of novelty of the invention as regards electro-magnetic engines consist—In combining with a rotating shaft, or "hub," a series of T-shaped armatures, consisting of radial arms and cross-heads extending laterally. The aforesaid T-shaped armatures are magnetically isolated from each other, and have no connection of any kind one with another except through the common shaft, or "hub," before mentioned. And as regards galvanic batteries, the features of novelty consist in the use and application of an alkaline nitrate, a copper sulphate, and sulphuric acid, united to form the negative combined in a porous cell carbon battery, with the nitro-hyposulphate of sodium for a positive. By the application of a nitro-hyposulphate of sodium or potassium to electric batteries the coating of the zinc thereof with quicksilver is rendered unnecessary.

CONSTRUCTION OF STEAM PUMPS.—The invention of Mr. JOHN CAMERON, of Salford, consists in casting the foundation plate, the pump cylinder, the columns with bearings for the crank shaft, and the bottom plate of the steam cylinder all in one piece, to economise labour and to avoid joints; and in forging the eccentric for working the steam valve with the crank shaft.

RAILWAY ROLLING STOCK.—The invention of Mr. H. HANDYSIDE, of Victoria-street, Westminster, relates to improvements in railway rolling-stock, and has for its object the breaking or bringing to a standstill all locomotives, carriages, or railway wagons, to which it is applied when descending steep inclines or when travelling at great speed or otherwise on more level portions of the line, and also to prevent retrograde motion of the locomotive or train of carriages or wagons, or any one or number of them, in the event of a coupling breaking, or for any other special object, when it is desired to hold either the locomotive or train, or portion thereof, at rest on any portion of a steep incline or any other portion of the line.

WHITE LEAD.—Mr. EDWARD MILNER, of Warrington, describes the manufacture of white lead by forcing carbonic acid gas into basic salts of lead held in a solution of chlorides to a definite result, as indicated by tests.

AUTOMATIC BRAKES FOR TRAMWAYS.—According to the invention of Mr. W. P. WIDDIFIELD, of Siloam, Canada, a revolving drum mounted on a swinging frame has fixed to it chains connected to the brake beams at both ends of the car or truck. This drum is driven from one of the axles by friction wheels brought into connection by the receding of the drawhead or buffer, when the vehicle is retarded in its motion. The winding of the brake chain is reversed to correspond with the direction or movement of the vehicle. And the winding-up apparatus can be applied to but one truck, the connection with all the other brakes being made by a chain or wire-rope passing over suitably arranged pulleys. By this means the whole of the brakes can be placed under the control of one man, while each vehicle can be fitted with the ordinary hand brake.

EXTENDED APPLICATION OF FIRE-CLAY.—The invention of Mr. F. LIPSCOMBE, of the Strand, consists in the manufacture or production of architectural trusses, copings, balusters, columns, pilasters, capitals, pier caps, window sills, corner blocks, window arches, mouldings, window cornices, parapets, fillings, terminals, or other objects of architectural decoration or utility, from fire clay of a suitable nature, or from mixtures of different fire-clays, or from mixtures of fire clay and other materials, by first moulding the materials, then partially drying, and afterwards heating the same in a kiln (technically termed biscuiting), afterwards glazing the articles with any material suitable for that purpose, and, finally, by the application of a suitable degree of heat in a kiln fixing the glaze; or the articles when moulded may be either wholly or partially glazed without the previous biscuiting, and in that state fired in a kiln to the proper degree of heat. By this means the various articles are rendered impervious to the weather, whilst at the same time their colour is preserved.

ATMOSPHERIC GAS.—The invention of Mr. JOHN R. ALLEN, of Chicago, U.S., relates to certain improvements in apparatus for carburetting air or gas for the purpose of illuminating and heating. its object being to thoroughly and uniformly charge the air or gas with the vapour of the hydrocarbon liquids, such, for example, as naptha, benzine, and the like. in such a manner as to produce when burnt a brilliant and steady flame. The invention consists of an open-mouthed vessel formed of two concentric cylinders united to a common bottom, and so arranged that an annular space is left between the two for containing water, in which annular space an ordinary gas holders is set. The inner cylinder, which forms the carburetting chamber, is constructed with a flaring mouth, the object of which is to prevent any hydrocarbon fluid from being carried over into the annular chamber between the two cylinders, and thus to avoid waste. Near the bottom of the inner chamber there is arranged a distributing box having discharge pipes, with an elbow or bend deflecting the air on the bottom of the carburetter in opposite directions, and making a thorough agitation of the hydrocarbon fluid.

FOREIGN MINING AND METALLURGY.

Large transactions are scarce, and business is rather dull upon the Paris iron market. At the same time, prices of certain descriptions of iron are well sustained in consequence of the demand which is anticipated from great works which the municipality of Paris is about to commence. In the Champagne group small orders continue to be received from day to day; prices have experienced no material variation. In the Meurthe-et-Moselle refining pig is obtained at 3*l.* 14s. per ton; business has shown little animation. In the South of France the situation remains much the same. Upon the whole, the state of affairs is not brilliant, but it might be a great deal worse, and some improvement is expected to result from orders in connection with the Universal Exhibition to be held in Paris in 1878. M. Mallet has made a proposal to the French Society of Civil Engineers to the effect that the society should organise a series of competitive experiments with the view of showing which is the best description of engine for working tramways. M. Mallet cites in support of his proposal the celebrated Rainhill trial of locomotives in 1829 in connection with the Manchester and Liverpool Railway. The French Railway Plant Company proposes a dividend of 1*l.* 16s. per share for 1875-6. Of this dividend 12s. per share has been already paid.

An adjudication for the supply of rather an important quantity of coal for the Belgtan State railways is about to take place at Liége and Charleroi; the whole quantity tendered for will be about 190,000 tons. In the present state of affairs it appears probable that Belgian coalowners will compete very keenly for this contract, and that from the sheer force of circumstances the State will be enabled to obtain very advantageous terms and conditions. The question of the renewal of certain treaties of commerce between Belgium and sundry foreign nations will shortly come on for consideration; the treaty between France and Belgium will expire in August, 1877. An interesting paper on the manufacture of briquettes of compressed lignite appears in the *Revue Universelle des Mines et de la Métallurgie*, published at Liége; this paper is from the pen of M. Wilcke, who holds a prominent position in some works at Streckan. The imports of foreign coal into Belgium continue to increase; thus they amounted in the first four months of this year to 237,000 tons, against 218,000 tons in the corresponding period of 1875, and 115,000 tons in the corresponding period of 1874. The exports in the first four months of this year were of about the same importance as in the correspondiug period of 1874, but they were 109,000 tons less than in the corresponding period of 1875. The aggregate exports in the first four months of 1876 were 1,104,000 tons, the greater part of which went to France. The Belgian Collieries Company commenced the payment, June 1, of a dividend of 8s. per share.

We gave last week some statistics showing that the production of coal in France last year was rather smaller than in 1874. The production of 1875 amounted, however, to 16,949,032 tons, as compared with 13,216,623 tons in 1869, so that the extraction of coal in France has, after all, made considerable progress during the last six years. Prices remain very low upon the French coal markets; the extraction is reduced for the present as much as possible, and English, German, and Belgian competition is developed on a considerable scale. Such are the general current features of the French coal trade. On Monday a mineral congress commenced its sittings at Douai. On Tuesday a visit was paid to the Courrières Mines and the zincworks of the Asturias Company. On Wednesday the members of the congress were invited to visit the Denain Forges and Steelworks. On Thursday the Anzin Forges received attention. The congress will terminate to-day (Saturday).

Official returns which have just appeared show that the imports into Belgium of steel bars, sheets, and wire, amounted in the first four months of the year to 1372 tons, against 1428 tons in the corresponding period of 1875, and 3500 tons in the corresponding period of 1874. The imports of steel into Belgium from England exhibit a very great decrease during the last two years, having amounted to only 487 tons in the first four months of 1876, as compared with 2700 tons in the first four months of 1874. Minerals and limailles were imported into Belgium from Prussia, the Grand Duchy of Luxembourg, the Low Countries, England, Spain, France, and Algiria, to the extent of 216,000 tons in the first four months of this year, against 302,000 tons in the first four months of 1875, and 207,000 tons in the first four months of 1874. The imports of rough pig and old iron into Belgium have steadily increased during the last two years, having amounted in the first four months of 1876 to 70,000 tons, against 47,000 tons in the first four months of 1875, and 45,000 tons in the first four months of 1874. The exports from Belgium of steel in bars, sheets, and wire, which amounted to 1120 tons in the first four months of 1874, increased to 1400 tons in the first four months of 1875, but they declined to 590 tons in the first four months of 1876. Minerals and limailles were exported from Belgium in the first four months of this year to the extent of 44,500 tons, against 35,500 tons in the corresponding period of 1875, and 21,000 tons in the corresponding period of 1874; the exports to Prussia somewhat increased this year. The exports of rough pig and old iron from Belgium have only slightly varied this year, the average having been 5300 for the first four months of each of the three years under review. It has not been the same with other articles, wire, rails, plates, chains, worked iron, &c.; thus, these exports amounted in the first four months of 1874 to 79,000 tons, to 63,000 tons in the first four months of 1875, and to 57,000 tons in the first four months of this year. Prices of iron have generally remained stationary upon the Belgian markets. Some of the Belgian mechanical construction establishments have work assured until the winter. The Rhenish Railway Company received tenders yesterday at Utrecht for a rather considerable quantity of rails. The Oberlansitz Cottbus and Grossentin Railway Company will let a contract on Monday for 500 tons of rails.

Chilian copper, in bars, has made 84*l.* per ton at Paris; ditto, ordinary descriptions, 82*l.*; ditto, in ingots, 85*l.* per ton; English tough cake, 85*l.* per ton; and pure Corocoro minerals, 84*l.* per ton. At Rotterdam, Drontheim has made 50 fls. to 52 fls.; and Russian Crown, 51 fls. Transactions have been noted in Banca at Rotterdam at 48 fls. to 48½ fls., while 44¼ fls. has been paid for Billiton. A sale has been noted of 29,300 ingots of Banca at an average price of 45¼ fls. Banca, delivered at Havre or Paris, has made 90*l.* per ton at Paris; Straits, ditto, 80*l.*; and English, delivered at Havre or Rouen, 81*l.* 10s. per ton. Quotations for lead and zinc have shown some feebleness, which has not, however, produced any additional animation in affairs. Vieille Montagne zinc, in sheets, has made 31*l.* 4s. per to at Marseilles.

MINING IN CALIFORNIA.—Consul Booker, in his annual report to the Foreign Office, gives the following account of the progress of mining in California:—At the commencement of 1875 we had every reason to look forward to a more than usually prosperous year, but the scarcity of rain in the spring, and what is of more consequence, of snow in the mountains, caused the supply of water in the autumn months to be insufficient to work many of the hydraulic mines, in consequence of which the yield of our gold mines has been fully $3,500,000 short of that of 1874. Every year more hydraulic mines are being worked, but there is frequently great expense attending the getting them into a working condition; many require long tunnels for drainage purposes, and some have to bring water from a long distance, and to construct storage reservoirs in the mountains. The Surveyor-General's report states the number of mining ditches to be 673, and 5170 miles in length. The same report gives the number of quartz mills at 290, and the quantity of ore crushed at 327,130 tons. In the county of Nevada, the great centre of quartz mining, there is a falling off from preceding years, but this country is rarely without some one mine yielding very largely. There have been no important discoveries during the year; the new district in Inyo county has not produced the quantity of base metal expected from it; for a time there was a large gathering of miners and speculators about the range of mountains in which the discovery was first made, but after a few months of prospecting the district was abandoned by most of those who had flocked to it, and at present only a few of the more promising mines are being worked. The silver mines of the neighbouring State of Nevada have produced in the past year over $40,000,000, of which amount one mine (Consolidated Virginia) has contributed close upon $17,000,000. A disastrous fire in October destroyed the hoisting works of this mine, and stopped for several weeks the extraction of ore. The Consolidated Virginia is probably at this time the most productive mine in the world. During the year 169,307 tons of ore were extracted from the mine, taken from the 1200, 1300, 1400, and 1500 ft. levels. The California, adjoining the Consolidated Virginia Mine, has been very thoroughly prospected by cross-cuts and drifts on the 1300, 1400, 1500, and 1550 ft. levels, and bids fair to rival its neighbour in richness. The yield of the quicksilver mines shows an increase of 30,000 flasks over that of 1874. The New Almaden, New Idria, and Redington Mines (observes Consul Booker) have each increased their production, and many new mines, under the encouragement afforded by high prices for quicksilver, have been opened, and yielded their quota to the general supply. The Guadalupe, in the neighbourhood of New Almaden, which had been closed for many years, has again been worked with marked success, the yield with one small furnace amounting to 3415 flasks. The quicksilver deposit, known by the name of the Sulphur Bank, in Lake County, owned by the California Borax Company is different to all other cinnabar mines in this country.

MINING IN AUSTRALASIA—MINING SUMMARY.

We have had great news from the Northern Territory during the month. A fresh rush has taken place at Sandy Creek, resulting in opening up the best alluvial diggings yet discovered in the Territory. Telegrams three weeks ago informed us that several parties were getting from 12 to 20 ozs. of gold per day, and we had previously heard that one party of three got 30 ozs., including a 13-oz. nugget, in one single week; that another party got 1 lb. in a single day; that Searle and party obtained 300 ozs. in a few weeks, and that it was reported that a 2-lb. nugget had been found. Later telegrams were to the effect that all the diggers at this rush were doing well. There have been good crushings at different reefs claims: 11 tons of stone from Westcott's No. 2 South Union yielded 350 ozs of amalgam, which was expected to give 150 ozs. of gold. A recent crushing at the Virginia returned 60 ozs. of gold from 25 tons of stone. Owing to the wet weather, flour had gone up to 80*l.* per ton; but the rain had ceased, the roads are better, and provisions are now being delivered on the diggings. Were it not for the tropical climate and past disappointments an immense number of diggers would find their way to these gold fields. The only news from gold mines in South Australia proper concerns the Lady Alice, which has been at low ebb in public favour, but now presents a more encouraging appearance, the last fortnightly crushing producing 63 ozs. of smelted gold, whereas the one just preceding yielded only 34½ ozs. of gold and 1¼ tons of copper.

In copper mines, the old Burra claims special notice, having lately furnished an encouraging report. Extensive work has been carried out, with the view of testing the mine at deep levels, and the cost of these operations has been nearly met by the returns from the ore raised. When the expensive shafts and other works now in hand are completed it is most probable that the Burra will once again become remunerative to the shareholders. Respecting the Wheal Burrawing, Capt. Tonkin reports on March 25:—"The water is considerably less than it was at time of last report. The lode looks well, and is showing some very rich oxide of copper of the same quality as the sample sent you. I send you 5 tons 14 cwts. of ore by the Lubra, raised from the 25 fm. level in the winze."

One of the latest and most important discoveries of copper is a rich disposit of ore about 130 miles north of Port Augustus, on the Beltana Run. It is said, in the nature of the country and also of the ore, strongly to resemble the old Burra Mine in the early days of its existence. There are quantities of rich green carbonates, mixed up in a kind of loamy soil, so that only puddling is required to separate the ore, which, on assay, has been found to yield from 34½ to 49½ per cent. of copper. It was for a short time worked by four miners, who sent a few tons of ore down to Port Augusta, but owing to the extreme dryness of the season they determined to sell their interest. The drought having now broken up, the mine, comprising 320 acres, has been secured, and a company is about to be formed for the purpose of working it. A large proportion of the shares have already been taken up privately. The promotors expect to get cartage either way at not exceeding 3*l.* 10s. per ton, and as there is any quantity of ore to be raised with very little trouble, and water and wood, as well as feed for cattle, are plentiful in the neighbourhood, they look to realising a handsome profit on the working. From the high quality of the ore it is likely to pay to ship direct from Port Augusta to England, better than to have it smelted in the colony. Capt. Matthews, late of the Sliding Rock Mine, has reported very favourably on the discovery, and from all we hear it appears likely to become an import ant addition to our list of copper mines, and an additional argument for constructing a railway into the rich mineral regions lying to the north of Port Augusta.

On Yorke Peninsula the Yelta is turning out heaps of ore; and there are good accounts from the North Yelta, which is said to be paying its expenses, and promising to return a profit before long. A new company has been formed to take up the Paramatta Mine, the old association having been pressed by creditors. The great trouble in this mine has been the hardness of the ground, but considerable quantities of ore are raised from it; and the captain in a recent report stated that the mine for the past four or five months had been paying its expenses. The Mid-Moonta is looking well, and other properties are being vigourously worked.—*Adelaide Advertiser*, April 21.

THE MOONTA.—We have received a copy of the accounts of this flourishing mine for the half-year ending March 26. The output of ore has been well sustained, the total quantity raised being 10,182 tons of 20 per cent. fine copper. As there were 3379 tons on hand, the directors found that they had 13,541 tons to dispose of during the six months just closed. Of this they sold to the Wallaroo Company, under terms of the agreement entered into some time ago, 10,265 tons, which realised the handsome sum of 128,112*l.* Against this the working expenses have been 86,599*l.*, so that the net return for the half-year has been over 40,000*l.* The ore on hand is worth nearly another 40,000*l.* The total assets, including this last item, are set down at 202,851*l.*, the buildings and machinery being valued at 142,573*l.* The liabilities stand at 23,984*l.* Two dividends of 10s. each per share, amounting together to 32,000*l.*, have been paid to the shareholders, and another 10s. per share has been declared payable on the 31st inst. Capt. Hancock gives detailed particulars of the working of 26 shafts, from which we gather that the yield varies from 1 ton to 8 tons per fathom, with a richness varying from 15 to 35 per cent. The stuff from some of the trial shafts is reported to present favourable indications, and the extensive plant and surface arrangements are all in efficient order. Altogether the position and prosperity of the mine continue to be most favourable and encouraging. The company's establishment at the present time comprises a total of 1589 persons, including 18 officers, 912 miners, 83 mechanics, 306 labourers, and 247 boys at the mine, and three officers in Adelaide

YORKE PENINSULA.—At the half-yearly meeting the directors reported that the operations of the past year had not been profitable. The number of hands employed on the mine are—65 on tutwork, seven on tribute, four tramming, wheeling, filling kibbles, landing, &c., 35 men and boys at surface, making a total of 111. The machinery is all in good condition and doing its work satisfactorily, and the prospect of the mine much more encouraging than it has been for a long time past, and during the six months there is every probability of the returns greatly increasing both in quantity and quality.

BURRA BURRA.—The 31st annual report of this still famous mine shows that during the six months ending March 31 the production of ore reached 9'0 tons of 27 per cent. of fine copper. This excellent result, the directors state, has been attained by continued improvement in the machinery for dressing, which is now so efficient and economical that extremely poor orey stuff can be profitably treated and brought up to a very high produce. It will no doubt be very assuring to the shareholders to learn that the works for proving the mines in depth are now nearly half completed, and afford most promising expectations; that while they have involved an outlay of upwards of 7000*l.*, the estimated cost has not been exceeded, and the funds available for their completion are amply sufficient; and that the works have already led to valuable discoveries. The balance sheet for the half year ending Sept. 30, 1875, shows that the receipts nearly equalled the expenditure, and that there was a credit at profit and loss of 14,248*l.*, after spending 3000*l.* on permanent improvements. The statement of liabilities and assets gives an idea of the present financial position of the association, and from this we gather that, after providing for every liability, there is a balance of unappropriated profit of 12,823*l.* There has been no less than 43,200 tons of haulage during the last six months, and 35,520 tons of ore have passed through the machinery. Captain Sanders, after giving an account of the detailed workings, states that so far as the deep workings have been developed the prospects exceed his expectations, and the good opinion he formerly held has been sustained. Settlement, it is stated, is rapidly extending in the neighbourhood of the mines; many additions and improvements have been made to the buildings in the townships of Kooringa and Graham; and numerous transactions in the leasing and selling of land therein have been entered into during the last half year.

BURRA BURRA.—The following is Capt. Sander's report, dated March 20, on the different points of operation in the underground workings at this mine:—"Good progress is being made in sinking Morphett's shaft. About 8 ft. have been sunk during the last four weeks; more would have been done but for the influx of water from the 70 fathom level north, on new lode, which made it necessary to fix a larger lift at the 70 fathom level. This occupied the shaftmen nearly a week, but we are now secure against a much larger influx of water. The lode in the shaft is still producing good stones of ore, but owing to the underlie the most orey part is gone out of the shaft to the eastward. Four men have been engaged cutting plat on north end of Morphett's shaft at the 70 fathom level. This is necessary, not only for starting a cross-cut east towards Tinline's lode, but also to make the shaft available for hauling with skips, the former plat being on the engine side instead of hauling side of shaft. In the 70 north, on new lode, 6 fms. east of old drivage, we have driven 4½ fms. north, have a fine-looking lode, although not rich; it is producing good stones of grey ore, letting out large streams of water, and improving as we extend northward. At Waterhouse's 60 the cross-cut east is in about 15 fms., letting out streams of water, so much so that the men can do but little. This is what I expected, and am glad to see, as I consider it a very good feature. I believe if we cut Tinline's lode at this level we shall divert nearly all the water from the north part of the mine through this cross cut. The cross cut west is in about 15 fms. Have passed through several branches of quartz from to 2 to 4 ft. wide, but have seen no spots of ore as yet. —Peacock's Shaft: If the old plans here are correct, we should ere this have holed the 50 fm. level to the long cross-cut going from Ayers's to Graves's. We are still pushing it on, and hope to hole shortly. The sinking at Bunce's is rather slow, the ground being hard; but at present it appears to be easing a little. The shaft we are sinking here is between the two deposits of ore, and we do not expect to meet with anything in the shape of ore till the shaft is down to the necessary depth (say, 22 fms.), and then cross-cut to the deposits. I see nothing particular in connection with the open work calling for special remark; everything is being pushed on as fast and as economical as we can."

BURRA.—Capt. Sanders wrote on April 17 that he had only to report, in addition to his general report of the 8th inst., published in the directors' half-yearly report, that the water is hauled from Graves's shaft, that men have started to drive and hole to the cross-cut, and commenced driving the incline tunnel. One pare of men are securing the top part, and another sinking Peacock's air shaft below the 40. Another pare are making the necessary preparations for fixing steam-hammer. All these new works will be pushed on as fast as possible without interfering with ordinary work.

QUEENSLAND.—Despatches from the gold fields bring accounts of great excitement regarding Mulligan's gold discoveries, situated 135 miles south-west of Cooktown, through Byerstown, on the Hodgkinson river. The alluvial is patchy and pure, coarse gold has been obtained from it. The reefs are numerous, and gold is plainly visible in the quartz. The extent of the field is 30 miles by 10.

NEW CALEDONIA, AND ITS NICKEL MINES.—An experienced Victorian miner and mine manager, who has recently returned from a lengthened visit to New Caledonia, whither he was sent on a tour of inspection by some Melbourne capitalists, has supplied to the "Melbourne Argus" an account of what he observed. The principal nickel mines now being worked are, he states, on the east coast of the island. The Ballard Mine, at Onilaw, and M. Hankar's mine, at Kannala, are the most important, their output of ore being of the value of about 1000*l.* per month. Most of it is sent to France. Contracts have been entered into under which all the ore that can be produced will be taken by continental European countries, and the demand is much greater than can be met until more mines are opened up. Most of the capital invested in the mines now at work is Melbourne capital. The Bank of Noumea advances freely upon ore at the rate of from 20*l.* to 25*l.* per ton, on ore yielding 10 per cent. of metal. The metal is worth 14s. per lb., at which price the American Government purchases nickel to be used as an alloy in its silver currency. Certain continental nations use it in the manufacture of their smaller coins. The demand for the metal is understood to be practicably unlimited. If only there was reasonable assurance of a considerable and steady supply it would be introduced into several of the manufacturing arts in which it has not yet found a place. Melbourne silversmiths would use it extensively if they could get it. Arrangements are now being made with a view to the further introduction of Australian and British capital into this new field of enterprise. Noumea is 1050 miles distant from Sydney, and is reached by steamship in about four days. The mining regulations of New Caledonia seem to have been framed on Victorian models with some improvements. There are no Wardens in its system, the commandants of the several military districts into which the Island has been divided exercising what local authority may be required. Miners' rights cost 25 frs. per annum, and consolidated rights are issued at the same rate per man for any number of miners, for a period not exceeding five years. Visitors to New Caledonia must enter at the Port of Noumea, and clear out from the same port, unless special permission is obtained to the contrary; but this indulgence is seldom granted. British and Australian residents in Noumea find themselves subject to regulations against which they feel greatly inclined to rebel, and against which they loudly protest. On all except Sunday nights a gun is fired at 10 o'clock, when all business must cease, publichouses be closed, and everybody must retire to his own home. The ordinary routine of work, rest, and recreation is prescribed by the authorities.

SCIENCE POPULARISED.—In connection with the subject of Air and its Relations to Life, Mr. Walter N. Hartley's name will be well remembered from the interesting series of lectures which he delivered at the Royal Institution some two years since, whilst the extent to which the information he gave was appreciated may be judged of from the fact that when republished as a separate volume the first edition was rapidly circulated, and the second* has now been issued. Besides the narration of facts an account is given of how those facts were obtained, thus offering an insight into the particular mode of reasoning employed in scientific research, and endowing the statements with that weight and interest necessary to leave a distinct impression on the mind. As far as is consistent with clearness of expression the use of scientific terms has been avoided. Throughout the volume the information is given in the most attractive and readable form, and the illustrations are sufficiently numerous to make it comprehensible to the least attentive. Much prominence is given to Pasteur's researches, the chapter upon which would alone make the volume worth purchasing. The book is one which cannot be too extensively read.

* "Air and its Relations to Life," being with some additions the substance of a course of lectures delivered in the summer of 1874 at the Royal Institution of Great Britain. By WALTER NOEL HARTLEY, F.C.S., Demonstrator of and Lecturer on Chemistry, Evening Classes, King's College, London. Second Edition. London: Longmans.

IRON AND STEEL.—The eighth edition of the very compact little volume—"Iron and Steel: a Work for the Forge, Foundry, Factory, and Office"—revised throughout and considerably enlarged by the author, Mr. CHARLES HOARE, has just been issued by Messrs. Crosby, Lockwood, and Co., of Stationers' Hall Court. The work is so well known that it will suffice to say that the anticipations likely to be formed from the title will be fully borne out by perusal; it is indeed a work for the forge, foundry, factory, and office. The information given, which appears to be reliable in character and likely to prove equally useful to ironmasters and their stocktakers, managers of bar, rail, plate, and sheet rolling-mills, iron and metal founders, mechanical, mining, and consulting engineers, architects and professional draughts men. In addition to an enormous number of notes which the practical man will like to have with him, Mr. Hoare gives many easily remembered rules which can often be applied with confidence and with much advantage. There is a very simple arithmetical method of utilising a well-known algebraical formula for the extraction of the cube root of numbers, a simple method of approximating areas, and so on. The simplicity of his rules may be judged of from that for multiplying together numbers between 10 and 20 by adding the units and multiplying by ten, and multiplying the tens and adding 100; thus, 17 by 19 (7 by 9) by 10=160; and (7 by 9) by 100=16¾, and 160 by 163=323, which is the answer, and can be obtained mentally in an instant. The book will not fail to retain the high reputation it has already obtained.

SOCIETY OF ENGINEERS.—The volume of "Transactions" for last year has just been issued (London: Spon, Charing Cross), and leaves no doubt as to the continued vitality of the society. In addition to the President's inaugural address, a number of very valuable papers on various branches of engineering, including those by Mr. J. W. Wilson, jun., on the Construction of Modern Piers; by Mr. H. W. Pendred, on Screw Propellers, their Shafts and Fittings; by Mr. T. Maude, on the Government Brake Trials; and by Mr. St. John V. Day, on Recent Arrangements of Continuous Brakes. To each of these the society's premium of books was awarded. There are also interesting papers on Practical Construction in the Colonies, by Mr. W. G. Farrar; on the Use of Paints as an Engineering Material, by Mr. Ernest Spon; and on an Improved Method of Charging and Drawing Gas Retorts, by Mr. F. W. Hartley. The several papers are illustrated with the necessary diagrams, and the discussions are carefully reported, the whole volume reflecting great credit upon Mr. P. F. Nursey, the secretary, by whom it is edited. In the discussion on Mr. Spon's paper the durability of iron paints was questioned by Mr. Hartley, who stated that they softened in water, probably owing to the presence of oil, and that he had to sacrifice appearance to durability and use coal tar, which when well prepared was the best preservative of iron he had met with.

STEAM-ENGINES.—Mr. H. CHERRY, mechanical engineer, of Aston, near Birmingham, has patented some improvements in steam-engines, and in direct-acting steam-pumping engines. One part of the invention consists of the following arrangement of the cut-off valves of steam-engines. Working on the back of the main valve is a cut-off valve, which covers one or other of the ports in the main valve, and cuts off steam from the corresponding end of the cylinder. This cut-off valve is moved by steam-pistons, the admission of steam to the cylinders of the said steam-pistons being controlled by a small slide-valve worked by mechanism, which is controlled by the governor. The steam-ports in the cut-off valve cylinders are small compared with the exhaust ports, and by means of packing rings in the cut off valve pistons the said ports are closed before the pistons reach the end of their stroke, so that only a small quantity of steam is used for working the cut off valve, and the exhaust steam is cushioned, and the pistons worked noiselessly. This invention consists further of the following improvements in the valves of direct-acting steam-pumping engines. On the steam cylinder, the steam chest containing the main slide-valve is bolted in the usual way. The steam-chest is bored out at each end to receive the pistons which move the main valve. The subsidiary valve which admits steams to them is placed on the connecting part of the casting. The subsidiary valve moves at right angles to the motion of the pistons and is worked by tappets by the main pistons. The edges and exhaust cavity of the subsidiary valve are shaped in such a manner that in normal working the steam is cut off and the exhaust opened to the pistons at such points in the stroke that the main valve shall travel its normal stroke, but if the main piston travels beyond its normal distance then the subsidiary valve will receive a longer travel, and its edge and exhaust cavity will be so disposed that the steam will be cut off earlier and the exhaust opened earlier to the pistons which move the main slide valve, thus shortening its stroke.

HORIZONTAL COMPOUND ENGINES.—The main feature of novelty in the invention of Mr. JAMES THOMPSON, of Newcastle-on-Tyne, is the production of an engine that shall possess the advantages and conveniences of a horizontal land engine, combined with those of a compound marine engine, or in other words, to work horizontally compound engines, which he believes has never before been done. From the crank of the propeller shaft or main shaft of the engine there rises a vertical connecting-rod worked by the united efforts of two levers—one a bell crank, and driven by the piston in the low-pressure cylinder, the other a beam lever, slightly out of horizontal, and driven by the piston in the high-pressure cylinder. The travel of the first mentioned piston is twice that of the high pressure piston. This difference is compensated for by a link from the end of the beam lever to the bell crank; this allows, as it were, the beam lever to expand to the full stroke. The cylinders lie horizontally, one above the other, and are supplied with steam from a three-way cock, which performs the duties of a slide valve. It is worked by an eccentric off the propeller shaft or main shaft, and performs simultaneously three distinct offices. Another motion of the eccentric rod reverses the order of things, as is usually arranged in the ordinary slide valve. The exhaust pipe is surrounded by a jacket of cold water flowing in the same direction as the exhaust steam, and as the said pipe terminates in an open mouth within the jacket of cold water, the water carries with it the condensed or exhausted steam.

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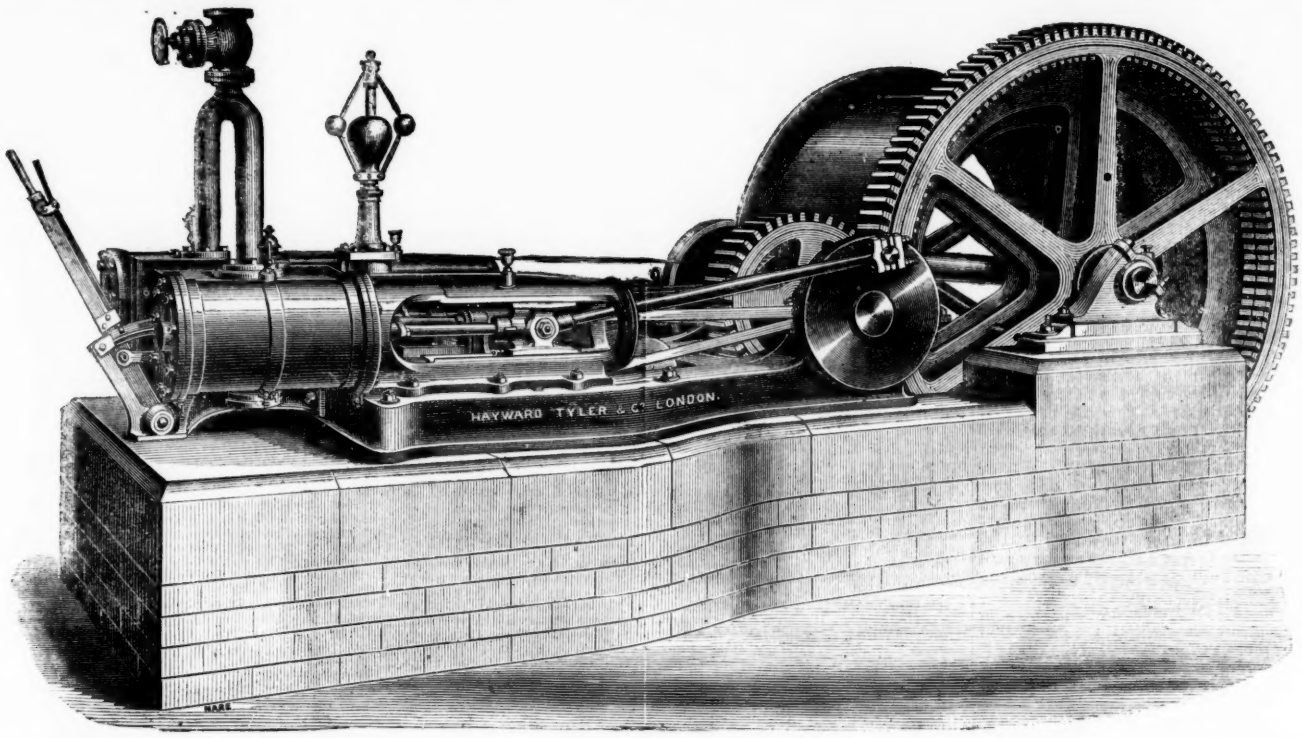

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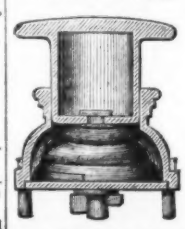

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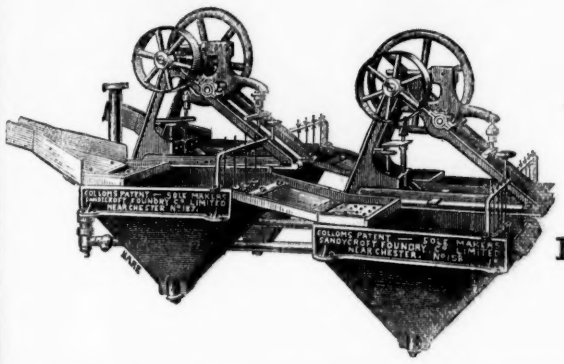

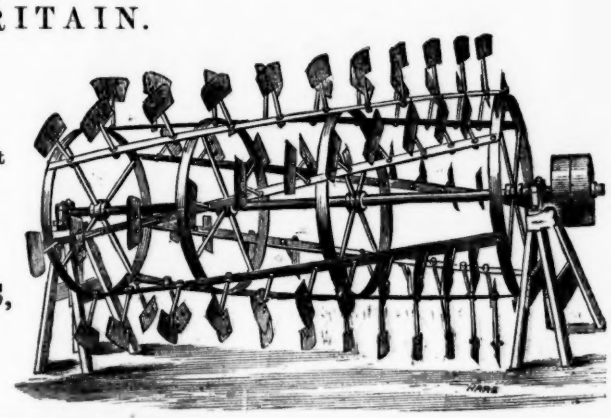

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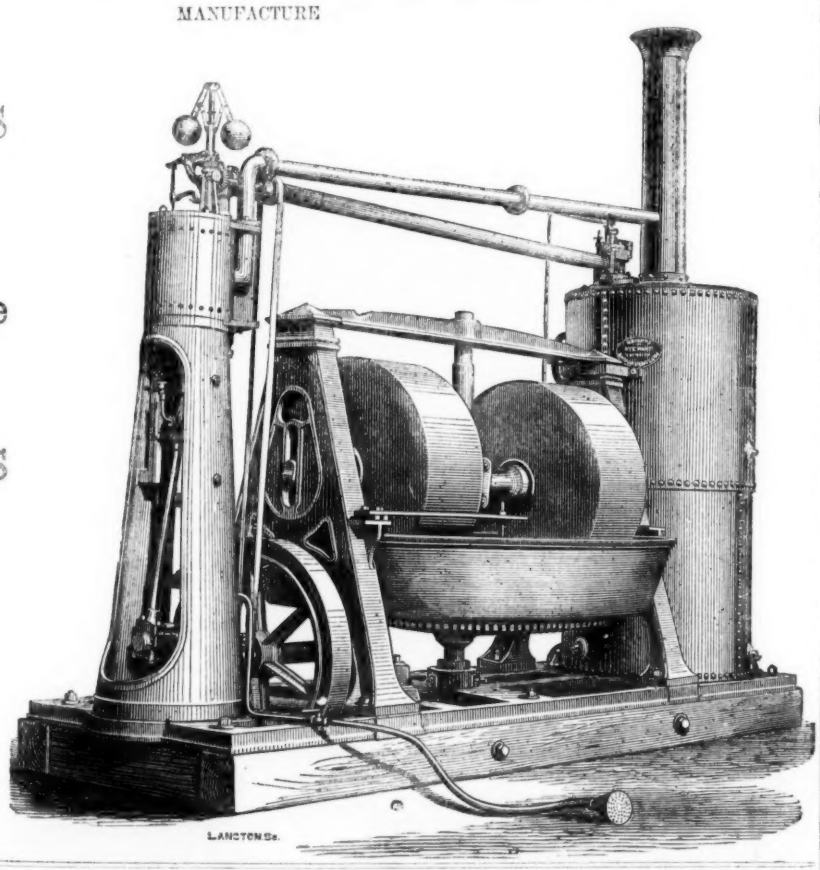

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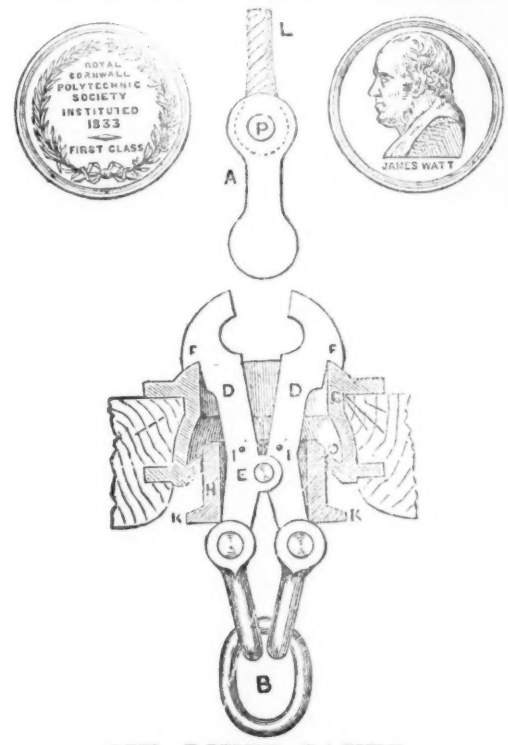

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